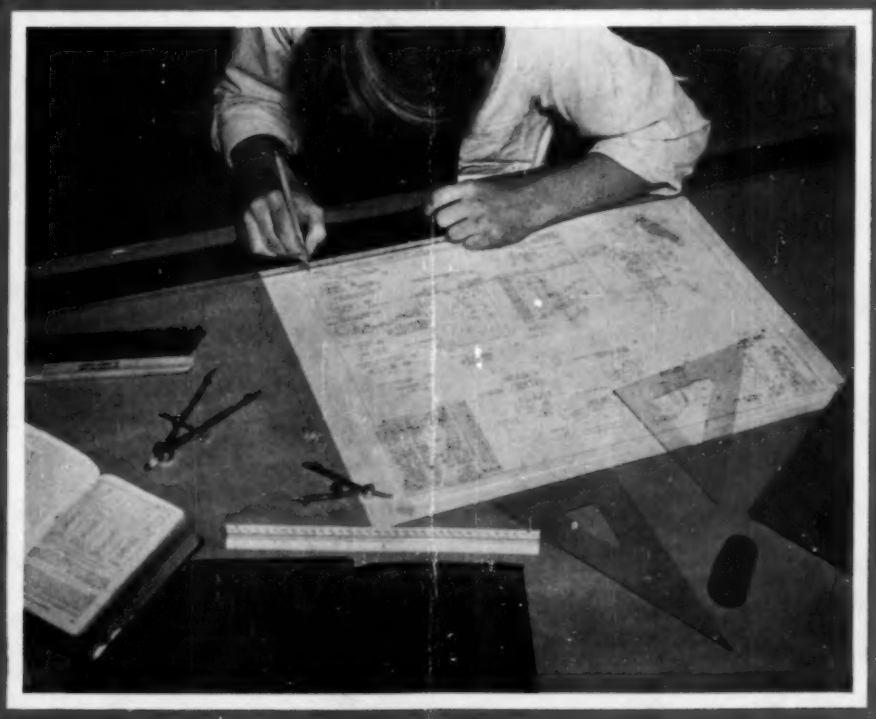
December, 1957 Vol. 46 No. 10

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine



It reaches far into the future

The Lake Pontchartrain Causeway is essentially a very long concrete bridge. Unlike other bridges, however, the concrete was *not* poured on location. It might almost be said this new monster was built on dry land and then erected where it was wanted. Thousands of precast prestressed concrete spans were assembled in just that manner. This new technique not only avoided the many difficulties and hazards inescapable with former construction methods, but it resulted in an economy in construction time and costs which will reach far into the future. Countless weeks of time and millions of dollars will thus be saved in building thousands of future highway bridges.

This story is typical of the American engineer and the products of his creative genius. But where does this genius come from? History shows us it is *not* hereditary. Distinguished engineers both past and present in most cases came from average homes. As youths they didn't act or react any differently than the lads who crowd our classrooms today. This creative genius, the spark of achievement, slumbers in every lad. Whether this spark is fanned into a flame before it is smothered decides the student's future. Time and time again, instructors of mechanical drawing have witnessed the awakening of this inner genius. Here the student discards his boyish fancies for the practical and achievable. For the first time he learns the meaning of precision craftsmanship. He begins to think analytically and to use sound judgment. During these formative days, impressions are indelible . . . good and bad. For this reason the student's drawing instruments should be selected with exacting care. Drawing instruments are basic tools of every engineer, and inferior tools will never inspire skilled workmanship. Drawing instruments are a lifetime possession, and the only instruments worthy of consideration are the very best the student can afford. Precision inspires precision...perfection inspires perfection.

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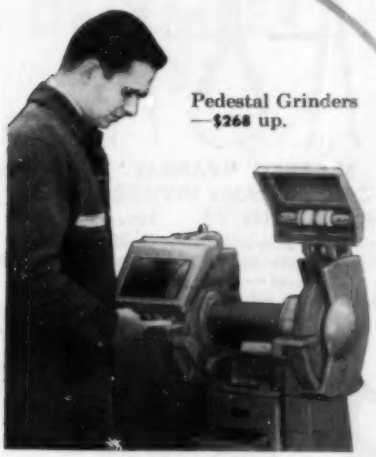
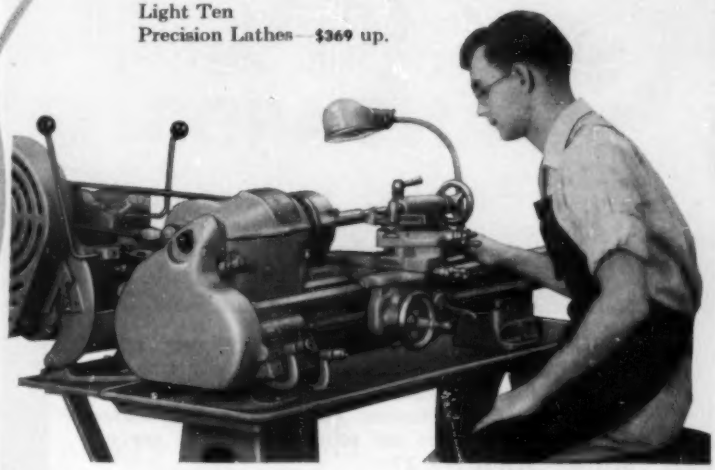


Pedestal Grinders —$268 up.

Light Ten Precision Lathes—$369 up.



Students Learn Faster on South Bends!

7″ Precision Bench Shapers—$573 up.

Time is always at a premium in every shop course—there's always more to teach than time permits. South Bend Machine Tools help overcome this condition. Simplicity of operation reduces the time needed to develop machine-handling ability. Students "catch on" faster and they can concentrate on developing their skills. Less work will be spoiled . . . and they'll need less supervision. South Bends accomplish this through their safety features . . . simplified power drives . . . positive action controls . . . distinctively shaped knobs recognizable by touch . . . large feed dials. Now is the time to find out all the advantages of South Bend Machine Tools—mail the coupon.

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SOUTH BEND LATHE, South Bend 22, Indiana

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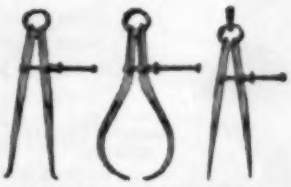
Priced to Fit School Shop Budgets

These tools are basic in any well-equipped school shop. They won't put a bulge in your budget but they will give your boys the invaluable experience of working with genuine Starrett Tools. For other Starrett Tools recommended for school shop use, see new Starrett Catalog No. 27.

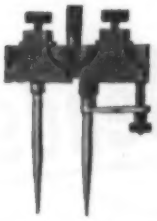


STARRETT "YANKEE" CALIPERS AND DIVIDERS
No. 73 No. 79 No. 83

Spring-type, side-adjusting inside and outside calipers and dividers made of high grade steel — strong, durable, well finished. Many other types available.

NO. 436 0-1" SATIN CHROME MICROMETER

Ruggedly built with new tapered frame plus no-glare, rust and stain resisting Satin Chrome Finish on sleeve and thimble, easy-to-clean black enameled frame, quick-reading figures, decimal equivalents on thimble.



NO. 50A IMPROVED TRAMMELS

Make your own beam of any length for these improved trammel heads. Two heads furnished (one fine-adjusting) plus socket for replacing either steel point with pencil. Use with any 3/8" x 3/4" beam.

NO. 11 12" COMBINATION SQUARE

The indispensable mechanics' tool. Square head and center head have easy-to-clean black wrinkle finish. Blade graduated in 8ths, 16ths, 32nds and 64ths. Other sizes and graduations available.

NO. 129 BENCH BLOCK

An excellent bench block and light anvil for heading, drilling, pin driving, etc. Hardened and ground to smooth finish with knurled side grip. Holes range from 1/8 to 5/8 inches. Size: 3" diameter by 1-1/2" high.

NO. 172A THICKNESS GAGE

One of a wide choice of types and leaf combinations. Made of the finest steel ground velvet smooth. Nine 1/2" x 3-1/16" leaves from .0015" to .015". Locking devices secure blades in any position. Straight or tapered leaves (shown).

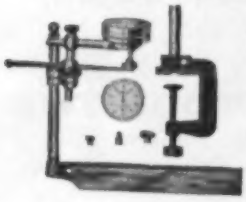
NO. 20 HARDENED STEEL SQUARE

A precision square with beam and blade hardened and ground to insure parallelism and straightness. Blade sizes from 1-1/2" to 36".

FREE EDUCATIONAL AIDS

New Bulletin 1203, "How to Read, Use Care for Micrometers and Vernier Gages." Also, "Training Aids Bulletin No. 1202" which shows many Starrett training aids available free or at small cost.

NO. 196A UNIVERSAL DIAL TEST INDICATOR



Ideal for teaching setup and inspection methods. Easy to set up, read and use, standard attachments provide for universal use on machine tool posts, arbors, face plates, surface gage spindle, etc. Graduated .001", reads 0-10, range 0-.002".

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DECEMBER
1957

VOL. 46 NO. 10

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

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This Month's Cover

This month's cover photograph shows Vincent Spiezio, drafting student, completing the job of assembly and details of a drill template in the shop class at Middlesex County Vocational and Technical High School, New Brunswick, N. J.

Photograph submitted by Charles F. Green, machine drawing instructor and head of drafting department.

The 1957 Index

If you are binding your copies of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION into volumes, you will undoubtedly want to refer to an index containing all of the material that has appeared during the last year. Since this is the last issue in Volume 46, may we urge you to write to our circulation department for a free copy of the index. A copy will be furnished to each subscriber as soon as the index is off the press.

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Association News

COMING CONVENTIONS

Nov. 28–30. Central Association of Science & Mathematics Teachers, at Congress Hotel, Chicago, Ill. Secretary, Virginia Terhune, Proviso Township High School, Maywood, Ill.

THE 1957 FOUR-STATE CONFERENCE

The Kansas State Teachers College of Pittsburg was host to the fifteenth Four-State Conference which convened on Friday and Saturday, October 11 and 12.

In attendance were 515 registered participants from the states of Arkansas, Kansas, Missouri, and Oklahoma, and such outlying states as Louisiana, Iowa, Illinois, and Virginia. An estimated 70 to 90 unregistered visitors brought the total attendance to approximately 600.

Featured speakers for the conference were Dr. Warren C. Lovinger, president of the Central Missouri State College, Warrensburg; Dean John B. Stout of Northwestern State College, Alva, Okla.; and John P. Walsh, director, Trade and Industrial Education Branch, U. S. Office of Education, Washington, D. C. These speakers dealt with important aspects of technical education, the theme of the 1957 conference.

Technical education was further discussed in ten sectional meetings on Friday and Saturday in the areas of industrial arts, trade and industrial education, and co-operative part-time and business education. The conference concluded with the Ship's program on Saturday afternoon.

NEW OFFICERS ELECTED

The Nebraska Vocational Association reports the election of new officers for the year 1957–58, to take office December 1, 1957. They are: president — Mrs. Wilda Carr, homemaking teacher, Holdrege; vice-president — Robert Eicher, assistant director, Nebraska State Trade School, Milford; secretary-treasurer — Glen H. Strain, supervisor, agriculture education, State Department of Education; counselors on executive committee — L. E. Watson, representing agriculture, Humboldt; Mrs. Doris McCaffey, representing guidance, Nebraska City; Margaret Briggs, representing homemaking, David City, Neb. — *Glen E. Dorsey, Retiring President.*

CALIFORNIA INDUSTRIAL ARTS TEACHERS CONVENE

The annual convention of the California Industrial Education Association will take place beginning March 14, 1958, at the Long Beach City Municipal Auditorium. The Hotel Lafayette will be the convention headquarters.

"Imagineering in Industrial Education" is the theme of the two-day session which will be patterned in the usual arrangement of general and separate sessions. However, tentative plans list an unusual number of special features. The first will be a television monitoring system by which delegates in the foyer may follow the proceedings in the separate sessions and then choose the one with the greatest interest. The second feature will be highlighted by over one hundred commercial and school exhibits. The third feature will emphasize the results of a long campaign to attract the ladies — teachers, wives, daughters, and friends. Educational sessions and displays will be structured to feminine appeal. In addition tours will be scheduled to outstanding tourist attractions. — *Ralph M. Rogers, publicity chairman.*

Personal News

DONALD C. CAMERON, EDUCATOR, DIES

Donald C. Cameron, former state director of vocational education in Nevada, died at his home in Carson City on September 24, 1957. He had been ill for some time.

From 1930 to 1950 Mr. Cameron served as supervisor of trade and industrial education, and for a five-year period served also as state director. He retired in 1950. Since that time he had been a consultant to several large mining corporations in the West, working particularly with Western Electro-Chemical Company. In 1951 he was assigned to a technical assistance mission of the International Labor Office and advanced vocational education with the mining and chemical industries of Mexico.

He was a champion for vocational education in Nevada and won national acclaim for his work in mining schools, and later in initiating an itinerant mining and prospector

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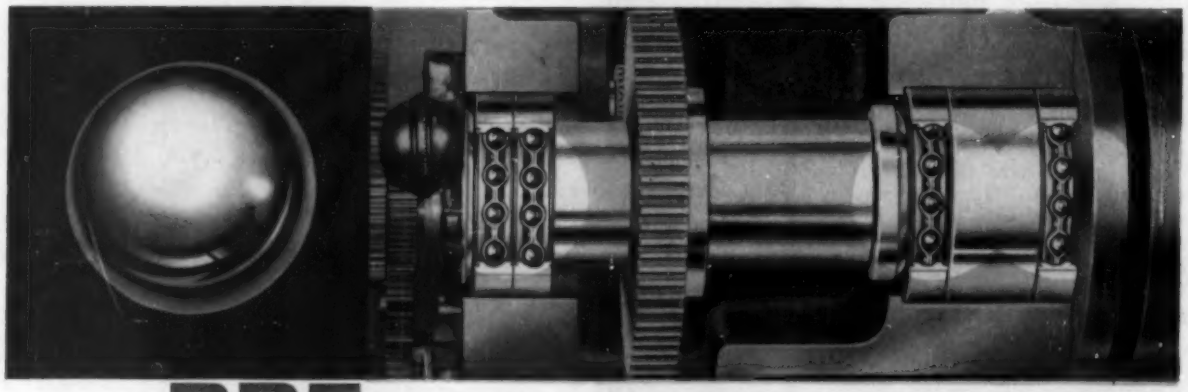

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You bet! That's why Spindles on **Logan** *Lathes need no bearing adjustment*

Heavy or light loads, high or low speeds, the ball bearing spindle on a Logan Lathe is always ready to roll. You don't have to set it tight for one job, loose for another.

Why? Because the ball bearings in a Logan spindle are not only pre-loaded and grease-sealed—they're *pre-set* for precision accuracy over a wide speed range. Thus, original spindle accuracy is sustained *far* longer than usual with plain or tapered roller bearing mountings.

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You have your choice of 2 sizes—specify (7) for 4 x 7" jaws with 9" opening or (10) for 4 x 10" jaws with 12" opening. Also your choice of 2 different continuous screw mechanisms—specify (R) for Rapid Acting "Power-Slide" Nut, or (C) for Solid Nut type. You may select between (P) Plain or (D) Dog type front jaws. You may specify (W) Seasoned Hardwood Handle, (T) Tubular Steel Handle, or (S) Adjustable Steel Handle.

For example, No. 7CDW specifies 4 x 7" jaws, 9" opening, solid nut mechanism, dog type front jaw, seasoned hardwood handle—old catalog No. 5CD.

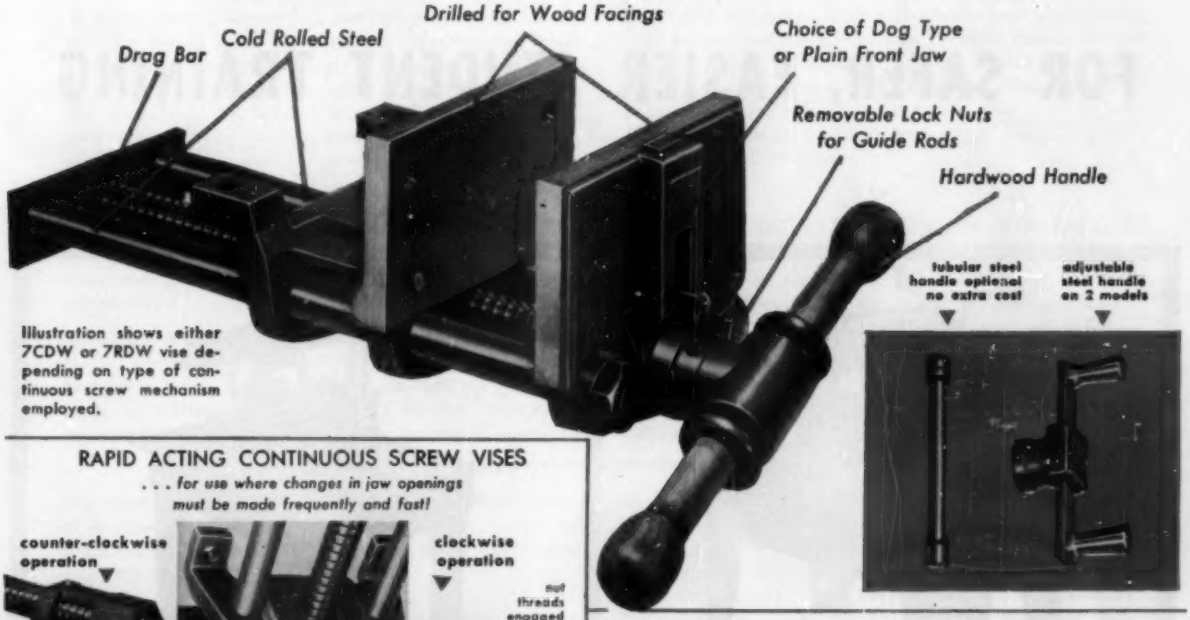
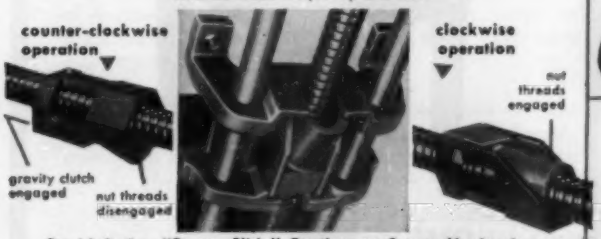

Drilled for Wood Facings
Drag Bar
Cold Rolled Steel
Choice of Dog Type or Plain Front Jaw
Removable Lock Nuts for Guide Rods
Hardwood Handle
tubular steel handle optional no extra cost
adjustable steel handle on 2 models

Illustration shows either 7CDW or 7RDW vise depending on type of continuous screw mechanism employed.

RAPID ACTING CONTINUOUS SCREW VISES

. . . for use where changes in jaw openings must be made frequently and fast!

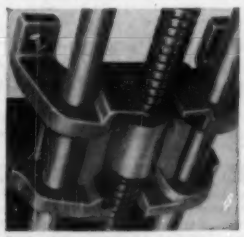


Rapid Acting "Power-Slide" Continuous Screw Mechanism

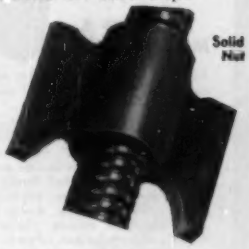
Key to superior operation is exclusive "Power-Slide" mechanism. This incorporates a gravity friction clutch which assures positive operation (no springs) and automatically compensates for wear. Counter-clockwise operation of screw disengages mechanism, facilitating "free sliding" adjustment of jaw opening. Clockwise operation of screw engages full 180° half-nut, producing continuous inward jaw movement and high pressure holding without slippage.

SOLID NUT CONTINUOUS SCREW VISES

. . . for general woodworking in in-dustrial and school shops!



▲ **Solid Nut Continuous Screw Mechanism**



Heavy steel screw is made with double lead, fast running thread to provide maximum speed of operation. Solid Nut assures long, repair-free life.

2 models of Solid Nut Continuous Screw Vises are made with special Adjustable Steel Handles for extra fast operation.

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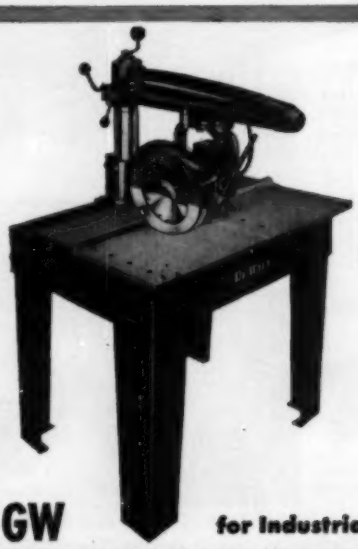
MODEL GA for Vocational Training

12- and 14-inch radial arm saws. 12" blade cuts 3½" deep, 14" blade cuts 4½" deep. Rips 28¾" wide, cross cuts 16" x 1" with standard arm. (Longer arm available.)

Uniform box-section non-retractable cantilever arm rotates 360° around the supporting column. Top-elevating crank. Quick-set miter locating latches at 0° and 45°. Eight (8) ball-bearing roller head rides directly on machined trackways inside arm. Direct-drive, totally-enclosed, fan-cooled motor (3425 r.p.m. full load), manual thermal switch. Calibrated miter, bevel, and rip scales, positive bevel-locating latches 0°, 45° and 90°. Steel table with legs, wood top. 14" diameter automatic safety guard with kickback device. (Select motor, saw blade and arm size from models shown below.) Power safety brake (optional).

Model	Std. Saw Blade	H.P.	Motor 3425 R.P.M.
GAK	12"	2	Single-phase, 60-cycle AC, 115/230 volts
GAN	14"	3	Three-phase, 60 cycle AC, 220/440 or 550 volts
GAO	14"	3	Three-phase, 60-cycle AC, 115/230 volts
GAR	14"	5	Three-phase, 60-cycle AC, 220/440 or 550 volts

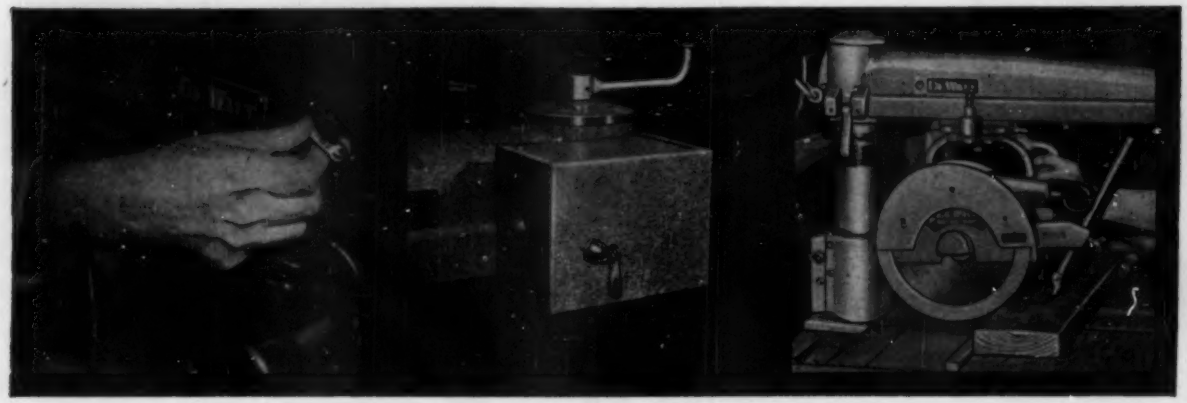


MODEL GW for Industrial Arts

10-inch radial arm saw, cuts 3" deep, rips 26" wide, cross-cuts 16" x 1". Uniform box-section non-retractable cantilever arm rotates 360° around the supporting column. Top-elevating crank. Quick-set miter locating latches at 0° and 45°. Four (4) ball-bearing roller head rides directly on machined trackways inside arm. 1½ h.p. direct-drive, protected, fan-cooled motor (3425 r.p.m. full load), manual key switch. Calibrated miter, bevel, and rip scales, positive bevel-locating latches 0°, 45° and 90°. Steel table with legs, wood top. 10" diameter saw and "Auto-float" safety guard with kickback device. Power safety brake (optional).

Model	Saw	H.P.	Motor 3425 R.P.M.
GW-1	10"	1½	120/240 volts, 1-phase, 60 cycles AC
GW-M	10"	1½	220, 440 or 550 volts, 3-phase, 60 cycles AC (Specify One Voltage)

AC 2-phase or 50 cycles available on request for GA and GW.



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You need De Walt SAFETY. *Only the AMF De Walt® Power Saw* offers you such a combination of safety features.

Top-side cutting action lets the operator see the blade *and* the layout mark for every cut. Blade action holds the material down and against the fence for added safety. *Pull-across cutting* lets the operator move *with* the saw for most cuts, not against it as with other tools. *All controls are above* the table and clearly marked for safe, sure set-ups every time. *Original Safety Key Switch* prevents unauthorized use. *Work is always level* and moves in a straight line – you fit the *saw* to the *work*, not vice versa as with other tools. No balancing lumber at awkward and dangerous angles. *Exclusive tool guard* adds still greater safety – completely encloses shaper knives and other tools, yet adjusts to any size lumber in seconds. *Special De Walt Power Brake* stops saw blade in a few seconds for maximum protection. *Spir'Ator Safety Return* automatically draws motor and blade to a safe position when released.

You need De Walt EFFICIENCY. One De Walt Power Saw actually does the work of *12 different power tools* – and does each one *as well or better* than a single purpose machine!

As a saw, De Walt makes every possible cut, quickly, safely, with unsurpassed accuracy. Instantly adjusts to any miter, bevel, or compound angle – sets up for either right- or left-hand ripping. Allows repeated cuts from one marking. *With a dado head,* De Walt's *precision depth control* and *top-side cutting* give on-the-line accuracy for all cuts. *Full-tilting arbor* simplifies rabbeting, grooving, radius and saucer cuts. *As a shaper,* De Walt provides maximum flexibility by tilting, raising, or lowering to *any* desired position – gives a *full 50% more shapes per cutter.* And you have another rotary tool every time you attach a different head to De Walt's powerful direct-drive motor. *Your one De Walt gives unsurpassed efficiency for every cutting job.*

You need De Walt PRACTICALITY. No other single piece of woodworking equipment makes as much "sense" as a De Walt in your shop, because no other offers such practical advantages.

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You may have seen the De Walt Power Saw demonstrated at the National or your State Convention. If not, see your Dealer for a demonstration. Send the coupon below for your FREE copy of "Job-Tested Cutting Methods". Valuable new shop teacher's aid now available—"Easy Ways to Expert Woodworking"—just $3.95.

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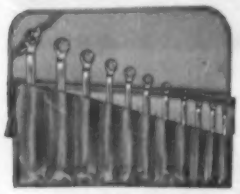
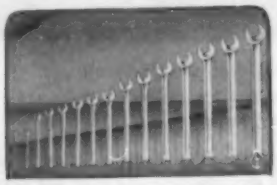
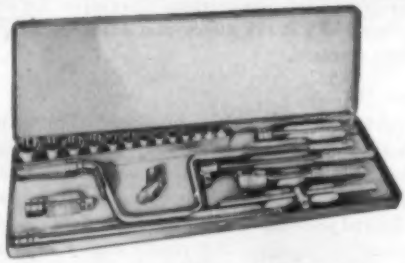
Train your students with *Snap-on* tools and give them the full benefit of shop instruction. Send them to their first jobs with a full knowledge of the tools used by most top-flight mechanics.



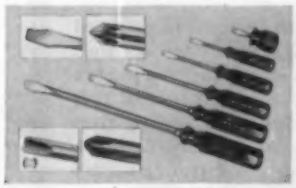
XV-611-K — 11 offset Boxocket® wrenches from 3/8" to 1¼". Knuckle-saving clearance, powerful leverage.



OEX-715-K — 15 combination wrenches from 5/16" to 1¼". Combines safe Boxocket® leverage and open-end, nut-turning speed.



221-F-B — 3/8" square drive socket wrench set — 21 matched units for tight places, hard-to-reach nuts. Many other sets available.



SNAP-ON SCREW DRIVERS — sizes and blade tips for every job. Shock-proof handles, tough, well-anchored blades.

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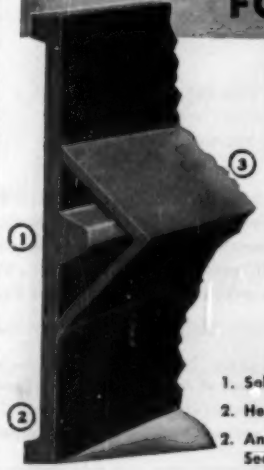

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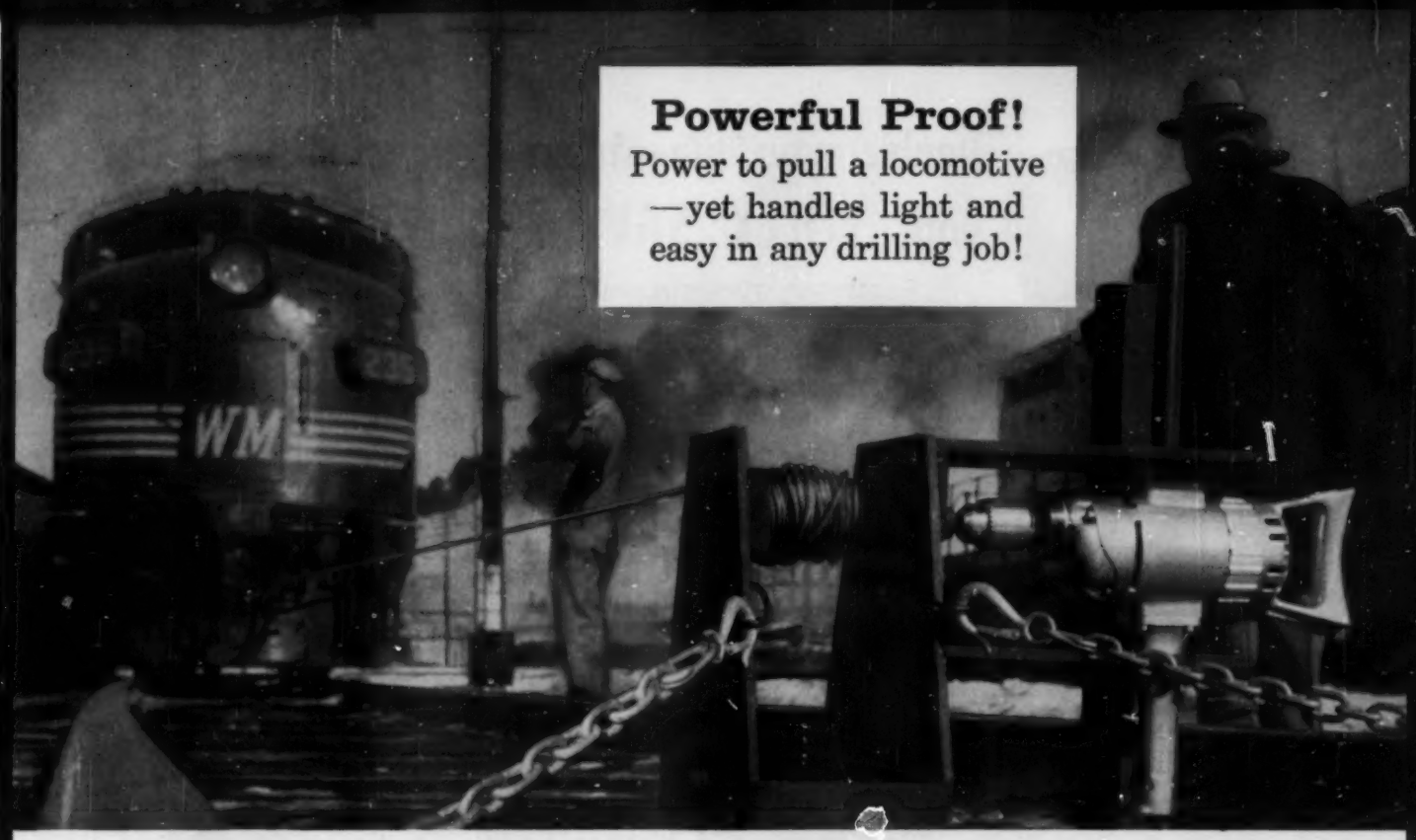

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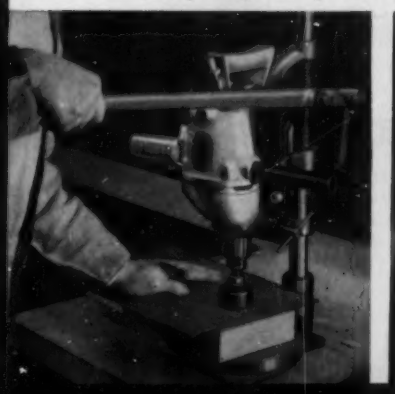

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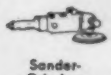
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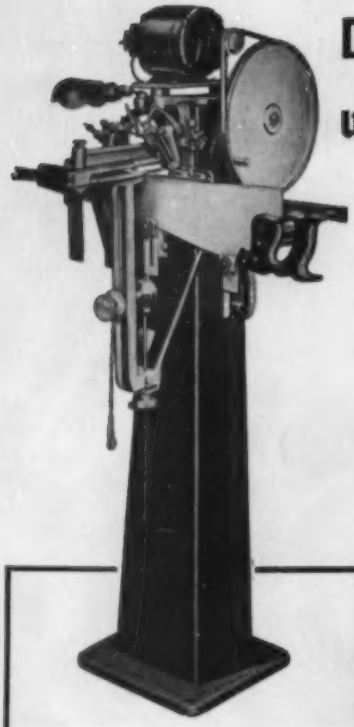

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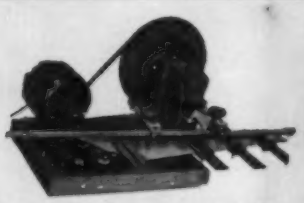
Files hand, band and cross-cut circular saws with machine accuracy. The saw is clamped in carrier which feeds it through all 3 machines for retoothing, filing, setting.



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Cuts new teeth in old saws (either straight or crowned edge) in one run through machine.

FOLEY SETTER

For both hand and band saws. Sets teeth on both sides in ONE run with perfect machine accuracy.

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Low cost Foley 314 Grinder sharpens circular saws up to 44" diam.; also dado heads, rotary power lawn mower blades, scissors, sharp edged tools. Sands, buffs, polishes.

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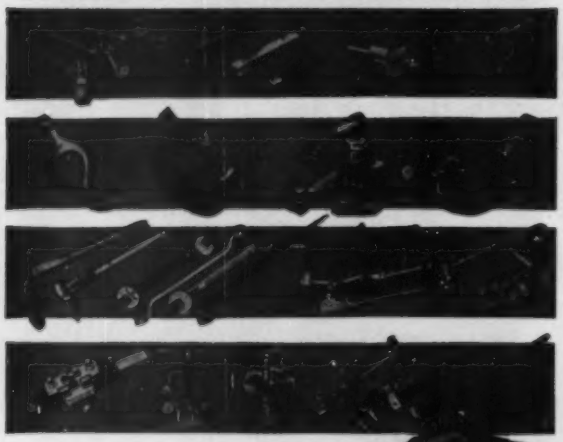

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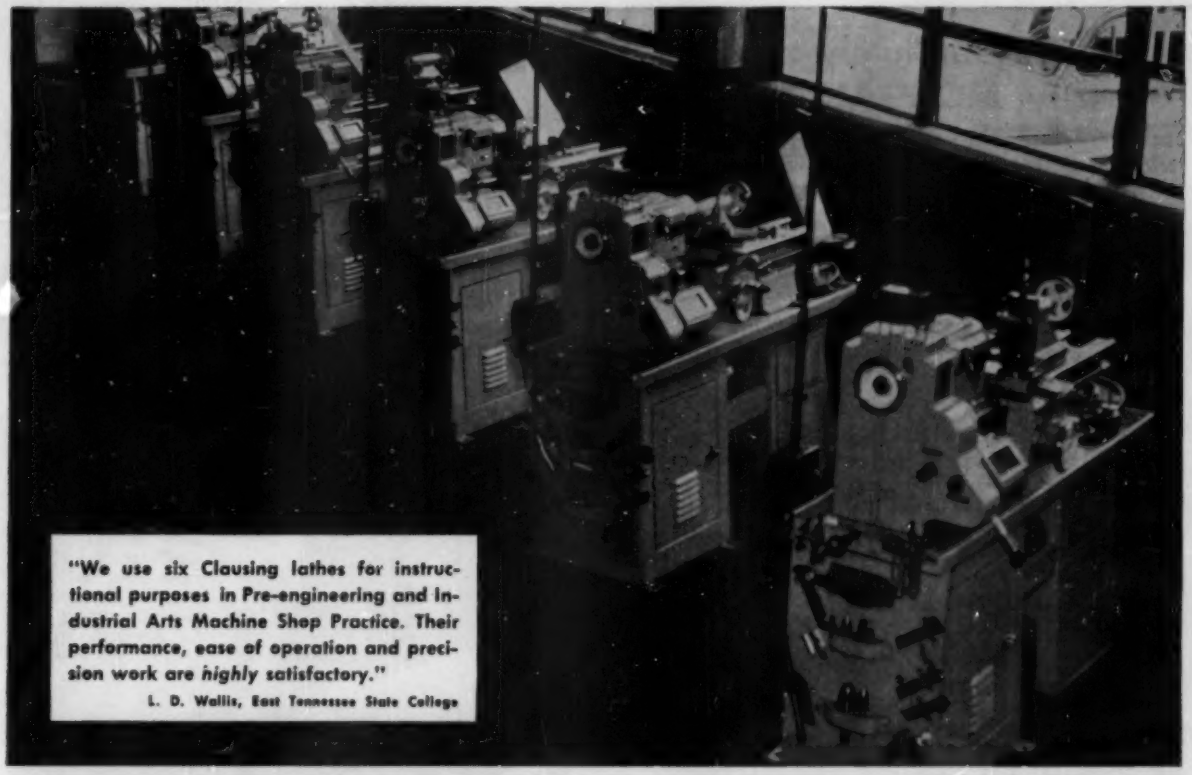

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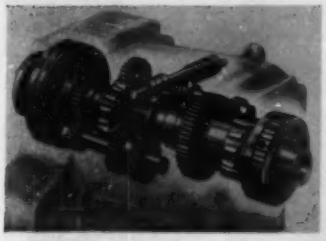
CLAUSING 6300-series 12¾" LATHES

"rate A+" for performance . . . safety . . . and value



Enclosed construction of headstock provides greater rigidity, safety . . . longer service life. All gears, shafts and bearings travel in a pumped bath of oil.

Quick-change box, too, is totally enclosed and gears and shafts turn in bath of oil . . . another important safety and long-service-life feature exclusive with Clausing in lathes of its class.

CONDENSED SPECIFICATIONS

Swing over bed	12¾"
Between centers	21½", 33½", 47"
Hole thru spindle	1⅜"
Thread range	54 selections, 4 to 224 Standard right or left
Motor recommended	1 or 1½ HP, 1 or 2 speed

Here's why:

They set the standard for rugged construction. Have flame hardened bed ways for longer wear. Headstock, apron and quick-change are *totally enclosed* . . . dirt and chips can't get in . . . *all gears and shafts travel in bath of oil.* Spindle is forged steel, turns on Timken "Zero-Precision" tapered roller bearings. Lead screw is ⅝" diameter . . . turns on Timken bearings. Has heavy-duty ball bearing countershaft. Two V-belts drive the spindle . . . belts are outboard for easy replacement.

They are unequalled for safety of operator and machine! All controls . . . including those for back gear engagement . . . are located outside machine. Headstock, apron and quick-change are totally enclosed . . . inquiring fingers can't get into the danger zones. Drive is underneath . . . no exposed belts or pulleys. Spindle nose is tapered Key-lock . . . eliminates danger of chuck run-off on braking or reversing. Apron and quick-change gears protected by safety devices . . . lead screw has easy-to-replace shear pin.

And Clausing 6300-series lathes are outstanding values. Prices, complete with cabinet mount and built-in countershaft, start at $1315, F.O.B. factory.

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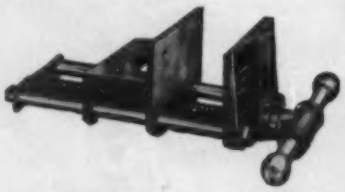
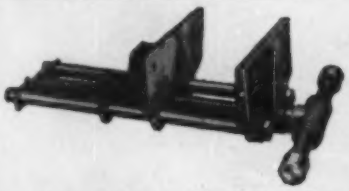
solid nut continuous screw vise



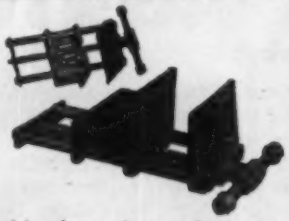
Semi-steel castings, cold rolled screw, solid nut, cold rolled side bars — all machined to close tolerances — tubular steel handle — aluminum or wood — similar model available with adjustable steel handle and stop in front jaw.

quick action vise



Semi-steel castings accurately machined, tubular steel handle, cold rolled screw with intercepted threads operates in a half nut, slight twist-of-the-wrist disengages, engages screw quickly — freeing or locking work in place.

18A dual purpose vise



Semi-steel castings machined to close tolerances, continuous buttress thread screw cut from heavy cold rolled stock, floating nut gives rapid action with smoother screw action, adjustable stop built into front jaw — this new development combines speed of Rapid Action with smooth screw action of a Continuous Screw Vise.

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4 ft. Universal,	$220.00
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THE **PARKS** No. 20
20" Thickness PLANER
WITH KNIFE-GRINDING ATTACHMENT

THE **PARKS** HEAVY-DUTY
12" Thickness PLANER

At left is the Parks Heavy-Duty 12" x 4" Planer—a compact, sturdy thickness planer with feed speed of 16 F. P. M. at 4000 R. P. M. Will handle material as short as 6" and as thin as ¼". Both planers are priced low enough for even the most modest shop budget. WRITE FOR COMPLETE DESCRIPTIVE LITERATURE.

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The Stanley No. 58 designed for strength and durability. Non-removable clamping device holds either leg or pencil. Fine adjustment screw ensures accurate setting. All parts locked on except the leg . . . a really "Boy-Proof" tool.

The Stanley No. 57 has two solid steel legs. Otherwise like No. 58. Both styles have hardened and tempered steel legs. Available in 6″ and 8″ sizes.

No. 58

¾ HP ROUTER

A versatile woodworking tool. Shapes edges, grooves, rabbets, mortises, inlays and templet cuts. Many woodworking jobs are easily and effectively accomplished with this multi-purpose tool. The speed of 20,000 RPM produces a surface where little sanding is necessary.

RBA

"Boy-Proof"

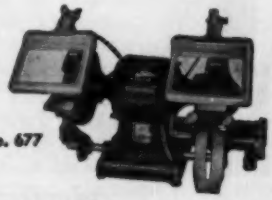
WOOD CHISEL

with 4½" Blade

STANLEY No. 40—Sturdy "Boy-Proof" for trouble-free performance in school shops. One-piece alloy steel blade and shank extend almost through the handle. Tough plastic handle assembled to blade—will not come loose. Steel cap on handle transmits hammer blow directly to cutting edge of blade. Blade has excellent and uniform cutting qualities. Made in complete range of sizes. Longer blade provides extra grinding life.

No. 40

BENCH GRINDER



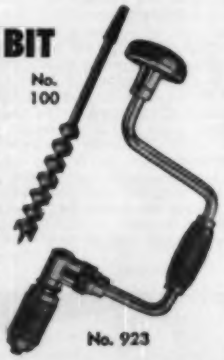
No. 677

Especially designed for the school shop. The grinding attachment is for all chisels and plane irons up to 2⅝″ wide. Equipped with "Flud-Lite" Eye Shields that cannot be moved to non-guarding position.

BIT BRACE & AUGER BIT

The Stanley "100 PLUS" No. 100—The Russell Jennings auger bit shown here is ideal for use with the 923 Brace. Individually tested, this double threaded screw point bit bores easily and cuts a smooth, accurate hole. Sizes 3/16″ to 33/16″.

The Stanley "100 PLUS" No. 923—This brace features the new, built-in Self-Centering Chuck that makes bit centering automatic and positive. It holds any size auger bit and straight shank drills from ⅛″ to ½″. 6, 8, 10, 12 and 14″ sweep.



No. 100

No. 923

"YANKEE"® PUSH DRILL

The Yankee "100 PLUS" No. 41—The mechanic's friend, this sturdy all metal tool is a handy shop tool. Bores small holes quickly with a one-hand drilling action. The drill point in use is locked in. Eight drills from 1/16″ to 11/64″ (by 64ths) are stored in the magazine handle.

No. 41

Use this coupon for more detailed information and school shop help.

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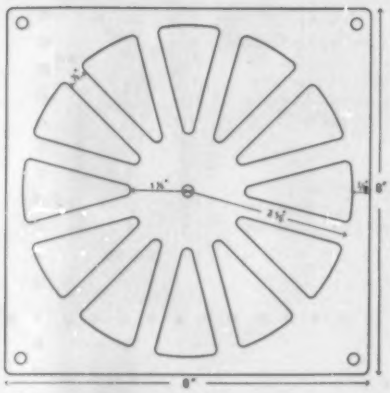
HOW-TO project for the School Shop

—by NICHOLSON FILE COMPANY

NO. 23 OF A SERIES

BRASS TRIVET



The Nicholson Half Round Brass and the Nicholson Mill Bastard files are shown in sizes reduced from those specified in the text.

Raw Materials Required: Brass sheet, size 8" x 8", 1/8" thickness; brass round rod, 4" length, 5/8" diameter; 4 brass 10-32 screws, 3/4" length.

Tools Required: Hacksaw, spiral hacksaw blade; layout dye; scriber; 1/4" drill, #21 drill, 10-32 hand tap and wrench; center punch; dividers; try square; Nicholson 8" Half Round Brass file; Nicholson 8" Mill Bastard file.

PROCEDURE

A heavy, all-brass trivet makes a handsome and practical gift that will be valued as a mark of your advancing handicraft skill. This one also makes an interesting brass-working project.

The platform is square, 8" x 8" size, with corners rounded to 1/4" radius to complement the contours of the legs. The delta-shaped cutouts of the design converge on the center in a fan pattern. The center is drilled for a 1/4" hole. Legs are 5/8" round rod, tapered down to 1/2" diameter, drilled deeply to recess the machine screw that fastens the leg to the trivet platform.

Hold try square stock against factory-cut edge of 1/8" brass sheet to scribe lines, for cutting the 8" x 8" platform. Cut with hacksaw, on waste side of scribe line, staying within 1/32" of the line (photo 1). Use Brass file to straighten the lines, checking with the try square.

If stock has no factory-cut edge, scribe two side lines, saw and file both sides so they match the square, then continue to cut and finish the other sides of the square.

Use a fillet gage to find a 1/4" radius curve for rounding each corner of the plate, scribe the curves and round them out with a shear tooth file.

Lay out your design on the 8" x 8" square of brass. Draw diagonal lines from corner to corner to find center. With compass, draw circle 1 1/4" from center and another circle 3 5/8" from center. The cutouts are separated with 1/2" fillets on each side, centering the first triangle 1/4" on one side of either diagonal line and continuing until all 12 triangles are equally spaced. Apply layout fluid and scribe pattern lines.

Drill a 1/4" hole at each corner of a triangle, locating the center punch at the intersection of the angle and the circle it bisects. Nail the stock to your scrap board, as shown in photo 2. Use a spiral-blade saw to make the cutouts. First fit the blade hook through one of the holes, clamp the blade in the saw frame and turn thumbnut until blade is taut.

Lock the brass sheet in a heavy vise, placing pieces of wood on each side to protect the brass from scratches and to help hold the brass so vibration is minimized (photo 3). Saw on the inside lines of the triangle until the cut is completed, then remove saw blade by opening the frame.

Smooth the sawed edges with a Nicholson 8" Half Round Brass file, finish in the corners and other areas with a Nicholson 8" Mill Bastard file (photo 4).

Drill a 1/4" hole at the center of the plate to conform with design. Then drill and tap holes for 10-32 screws at each corner of the plate, using a #21 drill, centered 7/16" from each side, for fastening the legs.

Legs are 7/8" long, file turned from 5/8" round rod and tapered down to 1/2" diameter. The smaller end is bored for 5/16" hole to depth of 1/2" to recess the 10-32 machine screw which holds the legs; continue with 3/16" drill through to the end.

Turn in brass leg screws tightly, saw off projecting end of screw at top of plate, and file down flush with plate surface to complete the assembly. Break all sharp edges and corners with a scraper. A light buffing on a cloth wheel, followed by a sprayed coat of clear lacquer completes the project.

FREE REPRINTS OF THIS PAGE

for school shops will be sent to instructors or school heads on request. Ask for "How-to Project No. 23" and state minimum number of copies required. NOTE: These and other Nicholson and Black Diamond files are available at industrial supply houses and better hardware stores.

Photo 1. To cut 8" square platform for trivet, cut with hacksaw on the waste side of the scribed line.

Photo 2. Lay out design on metal, then drill 1/4" holes at each corner of triangles. Nails hold work.

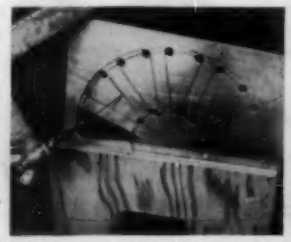


Photo 3. With wood protecting brass in a vise, cut out triangles. Move spiral blade along inside of lines.

Photo 4. Smooth sawed edges with Nicholson 8" Half Round Brass files. Legs and finishing complete project.

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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
DECEMBER 1957

The Mass Production Technique of Teaching Industry

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Fulfilling the needs of our youth is certainly a serious problem. The need to learn about our society, our industrial society, is of prime importance. Where in our present curriculum might we find the equipment, materials, and processes that can best be adapted to adequately experience the problems of industry? The industrial-arts shop is the answer.

Teaching Industry Through Industrial Arts

Industrial arts is that part of general education that teaches the mind to visualize and the hands to create. It includes the study of industry and the problems that man encounters because of industry. Fales defines industrial arts as the "broad study of the materials, organization, tools, processes, products, jobs and human problems of industry."[1]

Our industrial society is extremely complex. If we are to teach the basic fundamentals of industry in the industrial-arts shops we must decide upon the most significant aspect of industry of today. The methods used to teach industry must be dynamic, flexible, interesting, and practical.

Industrial visits are one means of teaching about industry. This method provides the students with a firsthand view of industry at work. Films about industry is a second method. Many large industries have produced excellent films showing the entire operation of the industry in thirty to forty-five minutes. Although this method is secondhand viewing, it has several advantages over the industrial visitation. The two most important advantages are the time factor and the broad coverage of the film. It would be impossible to visit a steel plant and see the mining of the ore, fabrication of the metal, and the uses of steel in one day. A good film can adequately cover the subject in forty-five minutes. Lectures and class reports about industry are still other methods of teaching industry.

The above four methods of teaching industry are useful but all are basically looking at or reading about industry. Every educator is aware of the advantages of "learning by doing."

> "Who learns by finding out has sevenfold
> The skill of him who learns by being told."[2]

Industry, therefore, should be taught by utilizing some form of work as the method for teaching industry. The form of work must be symbolic of today's industry. The mass production method of teaching industry provides all of the essentials and can be successfully carried on in the industrial-arts shops.

The Mass Production Method

In today's world more and more products are being produced on a mass production basis. The subject of production and its mechanics of operation is relatively untouched in schools today. The need to understand industry, to realize the significance of mass production, is of vital importance to our youth.

Industry's goal is production of profit, and all its activities are directed to this end, with the mass product as a symbol. By participating in a mass production experience, a student is led to consider all the problems related to the selling, financing, and construction of his product. The complexity of the problems are directly proportional to the maturity level of the students.

It is the function of our educational system to train the leaders of tomorrow. Can a man be an effective leader in an industrial society without an intelligent understanding of industry? "The responsibility of the schools is to provide opportunities for children to experience learning situations in which the technological as well as the human relationships of our democracy are present. This cannot be done through courses and credits. . . . Our students will not get the kind of insight they need to understand the relationships of man and machine until they can participate in real creative enterprise."[3]

Because of the special needs of production, new methods, materials and tools are used in this experience. The student soon realizes that if each operation is simplified and the operator's actions are limited to essentials, it is possible to produce a quality article with unskilled labor.

Introducing Mass Production to the Class

As with all teaching techniques, motivation is extremely important. The

class must be ready for mass production. The class must first grasp the importance of industry, then the connection between industry and mass production should develop from the class discussion. During the introductory sessions, an industrial visit is of great value. If a visit is not practical there are many films and related materials readily available from industry. The class can compare the individual or craft type product with today's assembly line product. The following should be included in the initial discussions:

1. Effect of mass production on consumption.
   a) Increased the amount of goods available.
   b) Raised standard of living.
   c) Shortened the work week.
2. Advantages of mass production.
   a) Savings in labor costs.
   b) Savings in cost of raw materials.
   c) Savings by full use of by-products.
   d) Superior quality.
   e) Simple replacement of parts.
3. Disadvantages of mass production.
   a) Monotonous character of work.
   b) Man becomes subordinate to machine.

The teacher will direct the discussion so as to include subjects such as cost of materials, jigs and fixtures, standardization of parts, design, job schedule, facilities, etc. During the discussion, as the idea unfolds, students will indicate their identification with the problem.

Planning for Production

The first problem that will require further study is the selection of an article for mass production. Everyone in the class will have his own ideas and it soon becomes evident that a committee must make the decisions of the class. The problems will group themselves into three main areas: engineering, production, and business. The class will then elect an engineer, a production manager, and a business manager. It should be kept in mind that this is an interpretation of industry, its methods and procedures. Therefore, responsibility delegated only as these few feel it necessary will provide more efficient organization.

The three students selected are excused from their normal classroom duties and take complete charge of the organization and planning involved in the mass production project, allowing the remainder of the class to carry on its normal activities through the planning and preparation stages. The committee then does research on the following topics:

Engineering	*Production*
Design	Skills
Facilities	Production schedule
Materials	Job schedule
Quantity	Preliminary work
	Subcontracting
Business	
Financing	Costs
Usefulness	Sales
Market value	Advertising

After two weeks, or as many weeks as necessary, the committee reports its activities to the class. The class must then decide between the two or three possible projects presented by the committee. Immediately after this decision is made the committee builds a pilot model. The pilot model or test model is constructed in exactly the same manner as the mass product. Jigs and fixtures are used in making the pilot model. The purpose of the pilot model is to improve upon the actual production procedures. Errors and inconsistencies are eliminated. Job operations and time limits are listed and qualifications for special jobs are defined.

The foreman is a leader, not a "boss," a co-ordinator of men and machines, a man of many responsibilities. The foreman is responsible for the training of the workers. He is responsible for the maintaining of quality and quantity of production.

It is suggested that the article selected be capable of production, in its entirety, in a single production period. There are circumstances, however, which might lead to the selection of an article requiring more time and operations than one period will permit. To accomplish the extra work the group can subcontract the work to a group of students who run a production job on some section of the larger job.

Financing of the article can be accomplished by several methods. The most common method is one in which the class buys equal shares of the company. A second method, not as valuable as the first, utilizes school materials supplied by the teacher. The "production for profit" aspect of industry becomes of prime concern to the stockholders in the former method. John Dewey states, "The absence of economic pressure in schools supplies an opportunity for reproducing industrial situations of mature life under conditions where the occupation can be carried on for its own sake."[4]

A training session is conducted prior to the production session. The machines, jigs, fixtures, and work stations are prepared and a preliminary run-through of the job is completed at this session.

The Production Session

The production session starts with the sound of a bell or whistle. The amount of enthusiasm and activity displayed during the production will amaze every educator, supervisor, and teacher that have ever witnessed this technique. The production session is actually the climax of all the planning and preparation. It serves as a method through which the more important problem solving and discussions leading up to and following it are motivated.

"Production should end with enough time remaining for the necessary housekeeping and for the students to inspect and evaluate their product. One of the most impressive lessons of the result of the division of labor and industrial organization is the sight of a large number of articles, well designed and alike in appearance, mechanically perfect and economically constructed. The advantage of such organization over the handicrafted, although it has been referred to many times in the preparatory stages, is never more apparent to the students than at the completion of the production run."[5]

The Discussion Sessions

The planning committee will lead the discussion sessions. Engineering, production, and management present complete reports. The engineering report should cover the number produced, the rate of production (by graph), critique on quality of article, and suggestions for production improvement. The production foreman reports on the worker problems, production problems, and suggestions for improvement. The business manager reports on the costs, investments, and sales.

"The discussion session . . . should be the most educationally rewarding of all the phases in the project. Meaning has been given to the industrial process, and the students' experiences have prepared them to think and act intelligently in reflecting on this meaning."[6]

Remember! This is an educational technique, not a method for producing more and better "pump lamps."

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Teaching-Aid Projects

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Many teachers of English, social studies, and the various sciences require their students to produce and turn in term papers or reports which require work outside of class. This affords the students an opportunity to do some research and constructive writing; thus complementing the subject material presented in class.

Some shop instructors also use this technique to excellent advantage for the topic material for such reports is virtually unlimited. A supplementary idea for the written report for shop work is the "teaching aid project."

Each student in the shop class is assigned or permitted to choose from a prepared list a display project which he is expected to complete within a specified time. The work performed on these projects is done at the student's convenience outside of the scheduled shop period. These displays may range from a small board containing a dozen different types of bolts to a large panel showing every type of nail produced. Limiting factors for most projects of this type are the imagination, ingenuity, and initiative of the individual student. By collecting, assembling, and mounting the various items of the display, the student learns many things about his project.

At the appointed time, each student brings his project to the shop for inspection. A written or oral report could be required with each project, however, the latter might be more beneficial since the entire class could learn more by hearing of the experiences each student had with his project.

Any one of a number of methods could be used to grade these displays; guest shop teachers from the same

Display projects designed and arranged by students

school or visiting schools could be invited as judges; the projects can be graded just as all the regular shop work is graded; each project could be identified only by a number and the entire class directed to judge and grade all the projects. Here again the individual shop instructor can devise a system best adapted to his particular situation.

A few points which can be used as a basis for grading or judging these projects are: the neatness or appearance, the amount of time involved in making the project, suitability of the display to be used as a teaching device. (Was the project made for a permanent display to be used or merely a temporary job produced for the occasion?) The individual shop instructor can use any additional criterion for judging these projects.

This type of project lends itself very well as display material at industrial-arts fairs, teacher conventions, parents night, or similar functions. Additional recognition can be given to those displays judged outstanding by having the builder's name and class year stamped on a metal plate, fastened to the project, and the project placed on the shop wall or some other prominent place where it can be seen by future classes.

Some excellent features about this type of project are that each can be working on a project in which he is interested. The instructor will be receiving teaching aids which can be helpful not only to the individual class making them, but to future classes as well. As more desirable displays are produced, they can replace the less efficient or less attractive. By this method the instructor has a continuous source of teaching aids to assist him in better presenting the desired shop material.

One method of introducing this type of project to a class is by placing all the pertinent information on a duplicated sheet of paper so that each student may receive a copy. The purpose of the project should be explained, the date project is due listed, the grading system given as well as the factors to be stressed in judging, how each project is to be identified, plus additional information the instructor may deem necessary. On this same sheet can be listed some suggestions for projects to aid students in making their choice or to stimulate some original projects which can be approved by the instructor.

Listed below are a few suggestions adapted to the woodshop:

1. Display showing various natural defects of lumber (knots, rot, shakes, pitch pockets, worm holes, etc.).
2. Display showing various manufacturing defects in lumber (torn grain, loosened grain, machine burns, chipped grain).
3. Display of various types of nails (common, finishing, special purpose, etc.).
4. Display of various types and sizes of wood screws.
5. Wood panels showing various paints, enamels, stains, etc.
6. Display showing various types of woods.
7. Display with small sections of tree limbs showing the grain of the wood and the bark characteristics.
8. Display of various types of abrasives (sand paper, emery cloth).
9. Display showing the different types and thicknesses of plywood and veneers.
10. Display of common moldings used in woodworking.
11. Display of some of the common hardware.
12. Thin section of a tree trunk with the various points of interest marked.

These are but a few ideas which could be used for teaching aid projects. Various samples of paints could be used; a display of normal size lumber is desirable; the various types of composition board used today have value; large working models of some of the more common hand tools certainly are useful. Unlimited seems to be the number of projects that could be made. Neither is this idea limited exclusively to woodworking. Any shop instructor can adapt this idea to his particular shop as well as to the age level of his particular students. This is one type of project which aids both the student and the instructor, and gives them a great measure of satisfaction.

Visible Progress in Teacher Education

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A sabbatical leave for research and travel during the fall semester of 1955 provided the opportunity for the writer to observe several industrial-arts teacher training programs. Approximately, thirty colleges and universities were visited, and they were chosen to be representative of this expanding area of education. These contemporary developments may be surprising as well as enlightening to members of the profession who have not had the opportunity for extensive travel in the past decade.

Physical Facilities

The least inescapable change in industrial-arts education is the many new buildings for the housing of expanding departments. Some of the institutions enjoying new or relatively new physical plants included: Kearney (Neb.) State Teachers College, the facilities of which were so well described in the March, 1956, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION magazine; Cedar Falls, Iowa; Oswego, N. Y.; California, Pa.; and Ball State College at Muncie, Ind.

These facilities exhibited careful planning and arrangement of classroom and laboratory space. Most of these were well lighted, ceilings were at a desirable height, with floor space ample to generous for each work station. In some instances, laboratories really appeared spacious, but department heads generally explained that when the expected increase in enrollments occurred in the decade of the 60's, the allocated space would be no more than satisfactory, if not a bit cramped.

Several other institutions reported that they were planning extensive modernization of existing facilities and some addition of space. Among these were the *A and M* colleges of Colorado, Iowa, Michigan, North Carolina, Florida, and Texas which were visited in that order. In those states not having an *A and M* college so designated, the institution mentioned is the state college as distinguished from the state university.

Improvements in existing facilities included new flooring, improved lighting, soundproofing, redecorating, and the rearrangement of conference rooms and offices for the instructional staff. Also,

*Harold J. Miller completed the requirements for the Doctor of Education degree at Oregon State College in the Summer of 1955, and his Sabbatical leave for Research and Travel was a post-doctoral project.

frequently noted were improved facilities for storing incoming materials and supplies, enlarged and dustproof finishing rooms, exhaust systems, and cabinets and display cases for craft work and exhibits.

New buildings in the planning stage or scheduled for completion within three years, included Millerville, Pa., State College, Florida State, at Tallahassee and the writer's own institution at Santa Barbara.

Equipment and Tools

Industrial production-type heavy machinery is on its way out and this includes much of the equipment acquired through sale of war surplus materials after World War II. Here and there, one of these *white elephants* may be observed still in operation, but these are rapidly being replaced with small more functional equipment better suited to educational objectives.

An item of equipment found in older institutions but now generally on its way to the scrap heap is the coal-fired forge. These are being replaced with the small gas fired forges and heat-treating furnaces. The new furnace makes for shop cleanliness and is much more efficient in starting and terminating classes.

In laboratories for foundry practice, the typical installation is the cupola of about a ton capacity. These are almost universally being replaced with small floor or pit type gas fired melting furnaces. For founding materials, aluminum, brass, bronze, and other low melting point alloys are replacing gray iron. The process is not being eliminated from the educational program, but the change is in equipment and materials in use.

Other observable changes in shop and laboratory equipment include relocation of power machinery in the light of good safety practice, aisle space suitable for material and student movement, with adequate working area around each machine. Another feature is the prevalent practice of arranging lathes and similar power equipment at an angle with the wall in order to improve lighting and freer movement of materials. Power saws are usually located near to stock storage areas, and the accessibility of tool panels increased through central location or near to bench areas. More and more, the typical arrangement is to locate tool and supply rooms common to adjoining shops where related activities are in operation.

Curriculum

Only a sprinkling of teacher training institutions are attempting to prepare industrial teachers with laboratories limited to shaping wood and metal and mechanical drawing rooms. A sharp increase was noted in the number of laboratories for electricity, printing, auto mechanics, and craft work in jewelry, leather, and textiles. Less common are laboratories for radio, boatbuilding, and aircraft mechanics. It may surprise some of the readers of this article to know that situations do exist where industrial education departments are attempting to train teachers with only metal and woodshops and some freehand and mechanical drawing. One deplorable situation was observed where only two instructors with such limited facilities as described, were offering a total of 32 courses according to the institutions catalogue. This was only one isolated instance and it probably will be improved shortly as the institution is planning to greatly expand its program.

Another curriculum situation exists in the industrial-teacher education programs in the A and M colleges and universities. Practically all mechanical drawing instruction is given in the engineering drawing classes within the college of engineering. In the state colleges, the course is usually given in the department, as none of the colleges include engineering in the curriculum. In the engineering departments, the instruction is highly theoretical while the colleges were observed to correlate the instruction more closely with other laboratory work in the department. This is especially true with the application of principles of design and proportion. The writer does not say this curriculum arrangement is good or bad, but reports it as a difference in course content and instructional material. Also, classes in engineering drawing were generally crowded with students and at least six classes were observed with 38 or more students as compared with the smaller classes of 16 to 24 in state colleges.

Professional Growth of Staff

A notable item in the study attracting attention is the number of staff members of industrial education departments working toward advanced degrees. At present, probably less than one quarter of the instructional staff of these educational institutions hold the doctorate degree; this proportion will rise sharply in the next five years, as many of the personnel interviewed were preparing dissertations or research in this direction. Again, almost all of the people entering the profession have the degree or are well along on such a program of studies.

This professional progress was not observed in colleges of engineering. As an example, one engineering college of a nationally recognized university listed a staff of 31 people and not one doctorate in the department. This might possibly be unusual, but still many professors of engineering subjects have not received the degree and reported that they were not interested in working for it.

Quality of Industrial Education Students

In at least ten institutions, I observed classes in engineering subjects and industrial education, moving from one department to another with the appropriate dean of department chairman. As to quality, personal appearance, application and seriousness of purpose, the two areas of education do not present any observable differences. Too, almost universally, dropouts from engineering programs are not being transferred to industrial education departments.

However, engineering students who cannot successfully cope with the mental processes of the required science and mathematics, sometimes back up and enroll in a junior college for one or two semesters, and then apply for admission to industrial-education departments as well as other areas of higher education. Directors reporting on this situation indicate a majority of these people with a second try at college and university work, do work entirely satisfactorily, and are successful on entering the profession.

Expansion of Industrial Arts Programs

In the line with increased enrollments in higher education generally, enrollments in the industrial-training area of education appear to be keeping pace with other areas of college and university education. This may not keep on long unless industrial education departments continue to receive their fair share of budgets for expansion. Most department chairmen were hopeful and expectant in the matter of growth and expansion of facilities and program.

This survey and report is not intended to be all inclusive. It is encouraging, however, to pessimistic observers, new buildings, and plans for additional facilities, expanding programs and enlarged instructional staffs, increase in curricular offerings and professional growth of faculty members make for optimism in the future. Given an adequate opportunity, industrial-education departments can continue to supply the nation with trained people who can successfully pass along to oncoming generations, our heritage of technical skills and knowledge.

It was very nice and pleasurable to meet former classmates and acquaintances, and to listen to them praise students, colleagues, and institutional administrations. Also, one could sympa-

thize with department chairmen regarding operational problems and then reflect with them on the genuine satisfaction of turning out a splendid product for the profession. In turn, it inspires one to resolve to return to his own classes and in the future do a better job.

Men Without Machines

2000 Years of Experience finds Stone-masons Craft Unchanged

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The area bordering the Mediterranean, from Gibraltar to the Suez, is dotted with ruins of the once magnificent structures of the Roman empire. Although less well known to the tourist than the Colisseum and Forum of Rome, the gigantic temples of Jupiter and Bacchus at Baalbek, Lebanon, are not only the largest works of the Roman builders, but are considered by scholars to be the finest example of Roman craftsmanship left standing.

In the Temple of Jupiter, majestic limestone columns rested on a massive podium some 45 feet above the surrounding plain and rose to a height of 65 ft., being capped by an entablature which added an additional 16 ft. in height. This great structure, the largest Corinthian temple constructed by the Romans, originally contained 54 columns and covered an area of 54,000 square feet.

Some individual stones in the substructure are as large as 12 by 14 by 64 ft., and weigh over 1000 tons. Exquisite carvings and meticulous polishing and fitting are still in evidence throughout the superstructure.

After the first breathtaking view of this fallen architectural giant, the visitor is staggered by the structural problem it must have presented to the builders of that day. Countless thousands labored for the 300 years from A.D. 50 to 350 in the erection of the numerous temples of Baalbek. Obviously, at that time, only the crudest of instruments by today's standards were employed. Yet stones were quarried, smoothed, polished, fitted, and secured into a structure of beauty and strength.

Today, in the city of Beirut, only a few miles distant from ancient Baalbek, craftsmen are following the Roman methods of construction, although on a

*Dr. Thomas S. Weir returned recently from a two-year assignment for the Department of State in Beirut, Lebanon.

Fig. 1. The Druze Temple as it appears after approximately two years of construction

Fig. 2. A stone mason with the tools of his trade. With these simple hand tools and thousands of hours of labor the Druze Temple will take form. Fig. 3. Stones are maneuvered without benefit of machines

Fig. 4. Flat surfaces are ground and polished by rubbing one stone over another

smaller scale, in the erection of a temple to house the secular offices of the Druze religion. Here one may observe first-hand the construction techniques that have been handed down almost unchanged for 2000 years. Due to the scarcity of timber and an abundance of cheap labor, practically all construction utilizes stone, which is plentiful along the southern coast of Lebanon.

Quarry operations make use of no power equipment or explosives; however, rough stones of suitable mass are transported to the building site by truck. So far as the Druze temple is concerned, the use of power machines ends when the rough limestone block falls from the truck bed. Next comes the task of chipping at the huge blocks until they conform to the exact dimensions required by their position in the building.

An assortment of chisels and hammers in the hands of the skilled mason eventually accomplishes this. After determining the size of the finished piece desired, one face of the stone is surfaced, which in turn becomes the base for the remaining surfaces. A simple square, meter stick, and thousands of blows with hammer and chisel complete the form. Where a polished surface is desired, the stone is rubbed back and forth in contact with a larger flat stone.

Fig. 5. Faud Jamil began his apprenticeship in the stone quarries, now is foreman of construction

Sand and water act as the initial abrasive, being replaced by finer polishing agents as the stone becomes smoother.

Fig. 6. Granite column quarried at Aswan, Egypt, and transported across the Mediterranean to Baalbek. Fig. 7. Cylinders become smooth when polished with a concave stone of the desired radius. Fig. 8. The stone mason considers it a day's work to cut three linear yards of fluting such as this. Fig. 9. A stone of the desired contour is used to polish fluted areas

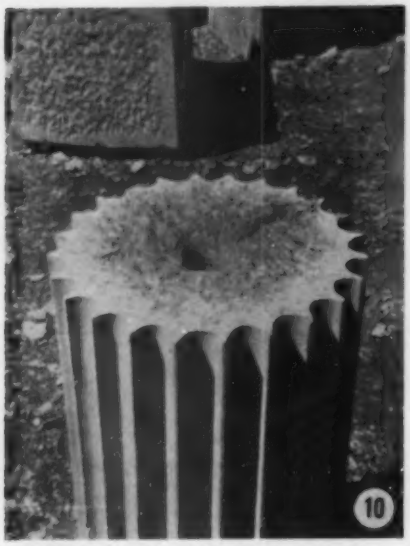

Fig. 10. The hole in the center of the stone is used to receive a dowel where sections of the column are joined

Irregular surfaces present a somewhat more difficult problem. Columns, for example, require a concave stone to carry the abrasive over the convex surface. Fluted cylinders necessitate the preparation of stone templates to do the polishing once the chisel has done its work.

Mortar is not used between the stones as they are piled into their final form. Larger columns frequently contain metal dowels at the centers of joining segments but one would find it difficult to slip a knife blade between any adjoining stones. This is indeed a tribute to the craftsmanship of the Labanese followers of the builders of the Baalbek temples. The reward to the craftsman hardly matches the magnificent and enduring structure he so laboriously erects. After a childhood of apprenticeship he can look forward to a 9-hour day (during which he can rough out about three 8 by 12 by 18-in. blocks) at 8 L.L.— less than $3 in an economy where the cost of living is equal to, or higher than, that of the United States.

This particular temple is expected to be four years in the process of construction and was designed by Sami Abdl Baki, who carefully supervises details of construction.

The contractor has no blueprints on the job but is given directions each day concerning dimensions, finishes, and materials to be worked on. These directions are then passed on to the stone masons and laborers. Amazingly enough, the finished product seems to be going together as conceived in the beginning.

Builders who have visited the Baalbek ruins and examined the work there state that the methods used to shape stone have passed on to the present unchanged. The skills continue to be transmitted unaffected by the clatter of concrete mixers and the twentieth-century invention of Permastone.

Fig. 11. A template is used to lay out fluted cylinders

Reproduction of Shop Drawings — Part VI

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Intermediates or Duplicate Tracings

Frequently it is desirable to use the original tracing or drawing to produce intermediates or duplicate tracings. This is done to preserve the original from the wear and tear of handling in the process of making a large number of prints. Furthermore, when several intermediates of the same original are made it will speed up production.

One of the main objections to blueprints has always been the difficulty of reading penciled or inked changes marked directly on a blueprint. The Vandyke printing process has been the initial answer to that problem. Vandykes are produced to act as intermediates from which either positive blue line prints can be made on blueprint paper or positive brown line prints can be made on Vandyke paper.

The back of the Vandyke intermediate may be transparentized with a coating of oil made from white vaseline and benzine. Transparentizing will increase the efficiency of making the final prints. The processes used to make blue line prints and brown line prints from this Vandyke intermediate are identical with those of the blueprinting and Vandyke process respectively.

Intermediates in either the dry diazo process or the moist diazo process are made by using a special transparent film or cloth. These intermediates may then be used to produce prints.

It can be seen from this discussion that both the dry diazo process and the moist diazo process are much more efficient in the production of intermediates than the Vandyke process.

To produce a positive line print using the Vandyke process involves 13 steps: exposure of the original water wash, hypo bath, water rinse, drying, transparentizing of the Vandyke intermediate, and drying; then exposure of the intermediate, water wash, hypo bath or potassium dichromate bath, water rinse and drying of the positive line print. The production of a positive line print from diazo intermediates requires only four steps, namely: exposure of the original and development to produce the intermediate, then exposure of the intermediate and development of the final print.

One of the uses of intermediates which may be made by either of the diazo processes on transparent film may be of special interest to educators. Visual aids which can be projected on a screen through an overhead projector may be prepared on this film. Several of these intermediates may be laid on top of one another to produce composite prints or overlays. The overlays have the advantage of showing the recombining of parts to illustrate the functioning of mechanical equipment. Such visual aids as these are being used extensively by the navy and other branches of the armed forces.

Evaluation of Industrial Arts Guidance Services

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A review of the professional literature which related to the guidance functions in the area of industrial arts was recently completed by the authors.[1] The following findings of that study are significant:

1. Few authors indicated a suggested scope, or degree of specificity, to be attached to the guidance services.

2. In those cases where scope was cited, the very general approach to vocational guidance based upon the broad areas of economic activity was conspicuously predominant. Guidance pointed toward the choice of a single occupation received no support. Guidance centered about job families, or groups of related occupations, was only infrequently suggested.

3. The techniques suggested for implementing guidance in industrial-arts courses have been largely those for the dissemination of occupational and educational information.

4. Few suggestions have been made relative to specific techniques to be used for student self-analysis, accumulation of personal data, counseling, placement and follow-up, and evaluation.

5. The concept of special areas of guidance, such as vocational, educational, personal-social, etc., is giving way to a more comprehensive, all-inclusive philosophy of guidance services.

6. The provision of guidance services is becoming an increasingly necessary segment of *all* education; the services of the classroom and shop teachers being integrated with the more specialized procedures of the school guidance staff.

7. While industrial-arts courses can be organized to afford valuable and effective guidance outcomes, presently, in many schools, any guidance outcomes through industrial arts are more likely to be incidental and only partially effective.

Now as never before, there is an urgent need for providing good guidance through industrial-arts courses. Unusual opportunities for achieving guidance outcomes abound in the industrial-arts laboratory. The authors have developed a rating scale for use by teachers, coordinators, supervisors and administrators who desire to evaluate the guidance aspects of their industrial-arts programs. This evaluative instrument should be of value to all educators who, like the authors, have found little published material pertaining to this problem.

In using the rating scale, the evaluator is reminded that the instrument incorporates the currently accepted objectives of *exploratory* industrial arts and *general* guidance. In some schools which are excellently staffed and well equipped the resultant rating may indicate "below minimum essentials." Such rating applies only to the guidance aspects of the industrial-arts program. Probably many of the programs receiving such rating present a more specialized, vocationally-slanted variety of industrial arts rather than courses planned as general educative experiences rich in guidance possibilities.

A Rating Scale for Guidance Services in Industrial-Arts Programs

Directions: Study the local industrial-arts program in terms of major divisions of this rating scale. Place an *X* through the number on each of the scales which best describe the local practice. Guideposts have been provided for each division as an aid to evaluation.

Key to Ratings:

1. Inadequate
2. Below minimum essentials
3. Meets minimum essentials
4. Moving toward a good program
5. A sound program

1 2 3 4 5

The shop atmosphere, administration, and instruction reflect little, if any, special qualifications of the teacher in guidance. Records reveal no formal or in-service preparation for guidance activities.

Records reveal the teacher is guidance conscious. He has some preparation but lacks the depth and recency of training and/or resourcefulness needed to relate guidance to his program in an effectual manner.

The shop teacher has not only kept abreast of the latest developments in his field, but possesses sound preparation and genuine interest in recent studies in guidance, psychology, and sociology. His program depicts sympathetic understanding of the individual and group attitudes of his students. He draws upon all available sources of data in securing the maximal outcomes inherent in a guidance-conscious shop program.

Guideposts

1. What is the nature and recency of the shop teacher's preparation in guidance and related subjects?
2. Is the teacher well informed on recent studies in the areas of guidance, psychology, and sociology?
3. Can the teacher interpret standardized test data?
4. Does the teacher "keep his finger on the pulse" of student needs, interests, and attitudes?
5. Does the teacher participate in faculty in-service training and action research

[1] Wallace M. Maurer, "Implementing Vocational Guidance Services in Industrial Arts," Unpublished Research Paper, The Stout Institute, Menomonie, Wis., 1955, pp. v + 52.

programs dealing with pupil studies, testing programs, student needs, etc.?

1 2 3
4 5

Guidance implications are not realized or emphasized. No provision is made in the course outline for presenting guidance information or providing guidance-centered activities.

Guidance implications are known. Provision is made in course outline for limited guidance activities. Guidance outcomes are incidental, however, to the shop activities stressing the acquisition of manual skills, production techniques, etc.

Guidance implications have been carefully defined in terms of expected student behavioral changes. Ample emphasis is placed on guidance as an integrated portion of the course. The teacher views the real value of his program as the assistance given to his individual students in making their maximal adjustments. Guidance is viewed as equally important with other course objectives.

Guideposts

1. Does review of the course outline reflect adequate emphasis on the presentation of guidance information and on conducting group-centered guidance activities?
2. Are the course objectives defined in terms of expected student behavioral changes?
3. Is adequate time devoted to achieving the guidance objective?
4. What does the teacher view as the most important contribution of his course to the total educative process?
5. What evidence exists of teacher awareness of the possibilities for integrating his class activities with all other school activities as a means of enhancing the effectiveness of the over-all school program?

1 2 3
4 5

The shop teacher rigidly adheres to an established course outline of the essential elements (skills and technical information to be acquired by pupils).

The shop teacher allows students a selected choice of activities and projects. He has flexible standards based upon individual differences; he knows that his program is chiefly significant for its general educative values.

The shop teacher envisions the shop as belonging to the students. He welcomes and arranges for student participation in planning the course content. He becomes the "stage hand" and "director" rather than the "star performer." He capitalizes on the unique social environment of the shop. Instruction is largely through cooperative group activities.

Guideposts

1. Is the course developed on analysis of activity to be taught or on analysis of student needs?
2. Is skill (speed and accuracy) stressed to the extent of rigid determination of the course grade?
3. Are *pre-vocational* or *general* values emphasized? What portion (weight) of the course grade is based on individual manipulative work?
4. Is student activity characterized by individual or group work?
5. Is a student personnel shop organization operative which promotes student participation in shop management?

1 2 3
4 5

The shop teacher spends little time in indicating the purpose of the course or the desired goals. No special orientation efforts are evidenced.

The student is given a knowledge of why the course is offered and what the outcomes for each pupil ought to be. A tour of the shop and a brief explanation of the activities carried on is a planned unit in the course outline. Some use is made of "referral data" supplied by the sending school or teacher.

Provision is made for orienting pupils and parents relative to the purpose and nature of industrial-art activities and hoped-for outcomes. The teacher carefully provides information and activities which help students adjust to the new shop environment. Home visitations by the teacher and shop visits by parents are used to aid the student in his adjustment to shop courses. Full use is made of the opportunity to provide the next teacher with advance facts about the class he will receive. Teacher uses the personal data he received as a means of understanding and aiding his pupils.

Guideposts

1. Are students made aware of the nature and purpose of industrial-arts courses via shop visits, school assembly programs, or other orientation activities?
2. Is there a planned program to orient parents as to the nature and intended outcomes of industrial-arts courses?
3. Is there adequate provision at the start of the course for student orientation in matters of course description, specific course requirements, shop regulations, safety, costs of materials, etc.? Is adequate time provided throughout the course for additional information as the situation may demand?
4. Is provision made for orienting pupils concerning their next shop courses; for orienting the next shop instructor in respect to the individual students he will receive?
5. Does the industrial-arts teacher carefully scrutinize and employ the data he receives about incoming students?

1 2 3
4 5

The shop teacher has time for, or is only interested in, keeping a record of grades. He finds little time to employ personal data compiled in the cumulative record.

The shop teacher recognizes the value of the cumulative record but lacks the available time and training to use or expand such data. He refers all pupil problems to the counselor or principal; he provides personal data about his students only upon request.

The shop teacher has an organized plan of observing and recording student behavior, ability, interest, and adjustment. His anecdotal records are forwarded to the counselor. He screens cumulative records of his students for insight into their needs and for data significant to his course.

Guideposts

1. Is the teacher familiar with the socio-economic and family background and previous scholastic record of his individual students?
2. Is there an organized plan for observing and recording pertinent student behavioral responses to the shop environment?
3. Does the teacher reflect a sympathetic understanding of the out-of-school problems which a student may bring to class?
4. What attempts are made to capitalize upon the less formal class organization and shop atmosphere in respect to gaining insight into the "how" and "why" of a student's sentiment toward: school, home, community, and life?
5. Does the shop teacher participate with other faculty members in typical case studies of persons experiencing adjustment difficulties?

1 2 3
4 5

The teacher is more concerned with his evaluation than with student self-appraisal. No fruitful program of activities which serves to promote self-evaluation and self-realization is evidenced.

The teacher does, in a limited way, tend to develop self-analysis. The devices used tend to emphasize only analysis of achievement of the technical processes and mastery of skills.

The teacher employs a wide range of student self-analysis and self-evaluation devices. These tend to emphasize the necessity for total adjustment rather than the mere mastery of manual and technical course content. Pupils are helped to attain this level through purposeful, worthwhile counseling.

Guideposts

1. Evaluation of course achievement ought to be a co-operative enterprise between student and teacher through the use of student project rating sheets, individual progress charts, and other instruments; does the shop teacher make such provisions?
2. Does the shop teacher explain the importance or make provision for the administration of, or provide information as to agencies which administer, standardized tests of special and mechanical aptitudes and vocational interests?
3. Does the teacher provide group-centered activities which afford the individual pupil occasion to feel out his personal qualities in terms of social acceptability?
4. Does the teacher plan activities which call for individual student insight into the civic and moral responsibilities? Are students led to the development of some concepts basic to formulation of a philosophy of life?
5. Are students led to a realization of the unique individual patterns of development, of physical and personality assets and liabilities, and of the significance of these factors in effective adjustment to changing life situations?

1 2 3
4 5

The shop teacher does not use community resources. He views the time available as barely adequate for covering the operation of the machines and for performing the processes outlined in the course of study. Out-of-school activities are viewed as too time consuming in planning and execution to be of real benefit to the course.

Some of the outside world is brought into the shop through a limited program of "secondhand" experiences largely drawn from talks by tradesmen and employers. No special planning enters into the scheduling of such activities; speakers are not advised concerning nature of topic desired; there is no follow-up activity to clinch the instruction.

The teacher compensates for the artificial school shop by providing many "first- and secondhand" experiences which extend class activities into community life. Useful and worthy community service projects are undertaken as group activities. The teacher improves school-community relations.

Guideposts

1. Is there a sufficient supply of up-to-date occupational information readily available to students?
2. Does the teacher plan assignments which call for student resourcefulness in securing and interpreting occupational information?
3. Are occupational studies supplemented by planned student activities such as: committee study of employment trends, completion of typical job application blanks, making an employment opportunity survey, participation in hypothetical job interviews, making follow-up studies of graduates, etc.?
4. Does the procedure to follow in studying an occupation receive greater teacher emphasis than the presentation of *now current* factual data?
5. Does the teacher stress the need for wise educational planning and development of wholesome personality traits as important to job success?

1 2 3
4 5

The teacher finds no time for personalized conferences with his students. He *unloads* his counseling responsibilities on the guidance counselor or home-room teacher. His guidance activity is largely a matter of incidental comment or lecture.

The teacher attempts to meet with students individually upon request. He is acquainted with counseling techniques and seeks to improve in ability. He plans activities which promote meaningful group guidance. His limitations are mostly due to inadequate allocation of time for the guidance aspects of his course.

The shop teacher serves on the guidance committee or as a referral source for data related to his instructional areas. He is a promoter of the comprehensive school guidance program and uses his influence and prestige with boys to broaden and improve the counseling and group guidance program.

Guideposts

1. Does the shop teacher maintain a record of individual counseling sessions? Are these co-ordinated with those of the school counselor?
2. Does the shop teacher promote a wholesome attitude toward the over-all school guidance program?
3. Is the shop teacher familiar with, and skilled in, the use of counseling techniques?
4. Does the shop teacher exploit his unique position in the eyes of school youth and use it as a means of assisting them in recognizing and solving their problems and in planning their work?
5. Does the shop teacher through individual conferences develop within his students a sense of personal worth, acceptance, need for self-appraisal, and desirability for self-direction?

1 2 3
4 5

The shop teacher has no assigned or assumed responsibility for assisting students in making adjustments to future vocational planning — either preparation for, or entry into, a field.

The shop teacher assists in school placement program, or tries to assist his pupils in their vocational plans through referral to job vacancies, or advisement relative to advanced preparation required and where to get such data.

The shop teacher actively participates in placement activities relating to jobs allied with his courses. He co-ordinates employment data and pupil applicants' data through a well-defined plan of placement. Pupils are provided with needed information about further school or training programs. Part-time work experience is emphasized as a vital guidance "tryout" service. School shopwork stresses content pertinent to individual needs of pupils in light of their vocational plans.

Guideposts

1. Does the shop teacher maintain congenial working relationships with industrial and business concerns in respect to employment opportunities for exploratory experiences through part-time or vacation work?
2. Where there is a central placement office, does the shop teacher help expand its program through his contacts with various local industries?
3. Are the shop teacher and his program well recognized by vocational schools and colleges?
4. Does the shop teacher have information or referral sources available about scholarships, apprenticeships, and co-operative educational programs in his area with which to assist the educational placement of his students?
5. Does the shop teacher assist pupils in assessing job opportunities in terms of their special aptitudes, their vocational power, and their likely job satisfaction?

1 2 3
4 5

The instructor has no findings to support the adequacy of his program. No special effort has been made to determine the adjustment of his former students to post-school work, educational, or community life.

The instructor has recognized the need for carrying on follow-up studies, but the only data available is the record of casual conversation with former students and their employers. No organized survey has been conducted.

The instructor has a well-planned follow-up program. Through it, he knows his shop program aids students' adjustment in later life. Some data has been collected which has direct relationship to the shop program.

Guideposts

1. Is a planned follow-up program operative?
2. Has the shop teacher impressed the administrator with the need for maintaining such an undertaking?

3. Are changes in the course content, student activity, and teaching methods made in the light of the findings of follow-up studies?
4. Are departing students impressed with the knowledge that the industrial-arts teacher stands ready to assist them in adjusting to later life experiences?
5. Are present students made aware of the results of follow-up studies of former graduates?

1 2 3
4 5

The shop teacher has no assigned or assumed responsibility for promoting recreational or extracurricular activities in the school or community.

The shop teacher carries on assigned duties in connection with school sponsored activities aside from his shop courses. He encourages students to develop leisure activities arising from their newly found interests in the school shop.

The shop teacher realizes the valuable contribution he can make by directing extracurricular clubs, recreational and avocational activities, or by giving individual assistance to such activities. He recognizes the need for promoting aesthetic and leisure activities related to his field for out-of-school youth and adult groups as well as his pupils.

Guideposts

1. Does the shop teacher serve as a sponsor or adviser for school sponsored clubs or recreational activities?
2. Does the shop teacher show interest in, and lend assistance to, individuals or groups carrying on hobbies related to his field?
3. Is the shop teacher active in promoting a community recreational program?
4. Does the shop teacher *sell* his administrator on the advantages to be gained by making his shop facilities available to adult avocational groups meeting under competent leadership and supervision?
5. Does the shop teacher recognize and exploit the opportunity to co-ordinate his shop program to the needs of boys clubs, scouting, youth dramatic groups, decoration committees for school parties, etc.?

1 2 3
4 5

Design in Industrial Arts

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Stout State College Summer Session

It is gratifying to see the over-all trend toward a professional level of design in industrial arts. Anyone who has followed the Ford Awards program, and especially he who is privileged to see the fifteen thousand entries at Dearborn, Mich., this year will experience a heartening thrill when he sees the upgrade of interest and effort on the part of school shops in combining the qualities felt through design with those produced through skills. This union of elements is bringing into form a superior symbol of deeper understanding. Whether it be in steel, wood, brass, or clay, our designer-teachers are touching the pulse of life in the breast of everyman. There is actually little in pure hand skills that an immature person might not do, but there is any height of greatness and attainment in the work of a man who has been taught to be sensitive enough to the world beyond himself, and broad enough to be able to use his acquired skills and direct his mental faculties to create a project which reflects the endless life within his fleshly shell.

When one dreams of the time when all shop teachers are designer-teachers, able to tap into life's limitless reservoir so close within each student, it is not difficult to imagine how overwhelming would be the impact of our work upon community and national life. We might then spark other agencies, and with them build a renaissance in America. If you object to the choice of words here, let us say, we could build a new America; new channels of balanced and selfless thinking, new standards of responsibility to each other, new doorways to serene and dignified living, the building of new environmental magnificence: all designed to attain the beauty and majesty of life.

That there is much to be done, we know; but let us go about it now. What seems a maze in our thinking, let us clear. Let us take hold of the building.

Everyone should know that the teacher in the department may make himself a designer-teacher of great worth, merely by associating with professional design sources.

There is still much misunderstanding as to the professional use of design as it is applied to plates, trays, and bowls in copper, aluminum, and brass. This category of work is selected for the present article because of the general miscomprehension of the principle underlying commodity design in the schools that do this work. It is clearly apparent that teachers are interested in design and they make great effort and show considerable ability when they cover area with nicely disposed decoration. Metal trays, being convenient vehicles, they are made the objects of much careful etching, chasing, and engraving, and it is often difficult to resist their perfection of execution and their charm, when they are placed in competition with their contemporary equals. So let us go about unraveling the hidden "musts" that govern the strikingly different type of trays and bowls created by professionals in the present trend.

First, here are a few statements that may meet with momentary and even extended opposition, but there is too little space here to defend them, so, would you give them consideration on the basis that they are not merely statements: they are the product of long study in challenging situations?

1. Hammering metal is a medieval process. Its value today is infinitesimal. The process today is pressing.

2. Chasing and repoussé, together with etching, are symbols of the past. Their only value today is the discipline they provide.

3. Peening was originally used to stimulate medieval hand shaping and working of metal. The ideal of the smith was to make his work so smooth as to hide the fact that it was hammered. He used the word "planish," which means "make plain." This, peening reverses the traditional ideal. It is, in fact, a form of hypocrisy because it presumes to smooth metal by hammer when the metal was previously smooth by rolling.

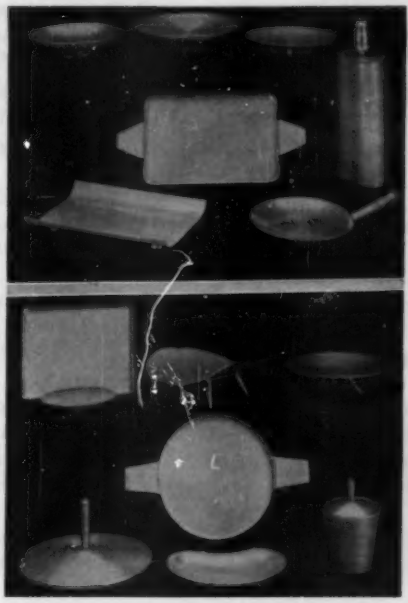
Peening does another objectionable trick, it produces a nervous and busy area which tends both to superimpose its texture over the beauty of the metal itself, and it injects its self-importance into the body of the design in a way that overshadows the primary reason for the tray; i.e., its function. Thus, peening opposes unity in the design, and it "fights" every other element in the design. Peening, outside of the above, hardly has a defensible place in contemporary expression.

4. Scalloping, crimping, and cutting into edges has a similar decadent history. It is self-conscious and impertinent. The excess deprives the whole of the design of dominance and unity; like a spoiled child, it wants to be seen above its peers. Its peer, in this case, is the use, i.e., the food to be placed on the tray. Furthermore, the outer edge of the tray or plate is its frame, and that is all. The circular or oval frame is a continuous or "eternal" line, and to break into this line is an act of poor judgment.

5. Irrelevant subject matter traced over the center surface of the tray with a tool or by etching comes under the same rule of impropriety as does peening and scalloping. Horse heads, sailboats, dogs, deer, foilage, or landscape have nothing to do with the food to be placed on the tray. They, again, demand attention out of proportion to their place, and being an entirely new note in the design, they vie with the more functional elements in the design for dominance. This breaks the necessary unity and rates the project, no matter how professionally it is executed, as amateur.

6. Extraneous additions, such as handles, feet, and rims, when they break into the unity of the whole design by overemphasis, or by overconspicuous and daring form (unrelated to the tray) are inexcusable.

Now that we have listed the mistakes of the past, let us understand how professional designers handle the problem of plate, tray, and bowl design when they create according to the philosophy of our contemporary times. The list may have seemed unnecessarily dictatorial to you. As a matter of fact, the same list is a proclamation of freedom to a contemporary designer. It cuts him free from the dictatorship of tightly hedged tradition, of which the types referred to in the listing are decadent members. He is free to be himself. He is free to express from deep within, the beauty of his feelings of rhythm and music, and he may express it just as he prefers, if it be worthy and inventive and well thought out. If it then is true expression, it will be loyal to the time, it will honestly symbolize the science and the power of the time, and it will portray the movement and the spaces that are a part of the life of the time. This may not be clear. One who sincerely wants to know what it means might try sitting down with a soft pencil and a block of paper in a quiet spot by himself, especially after he has faithfully leafed through his monthly professional source magazine and noted the new contemporary forms, and then, let him play with form. Let him try creating tray and bowl forms in the spirit of the jet age. The age spans vast spaces. Then, tray spaces, to be as vast, must employ unbroken clean areas without a mark or a line. All emphasis is upon the majesty of the space, and the dignity and serenity of the outer form, and thus detail melts into insignificance. Preferably, the piece stands off the ground, in recognition of the air age, but members which are the means of raising it off the ground are uncompromisingly reserved. Everything about the design is an emphasis of the primary function, and thus the design is one-pointed and powerful.



Contemporary designs for metal trays and plates

The design may not please the masses, and students may not immediately understand the sudden reserve, but its quality will assert itself, especially by comparison. By means of explanation, the student will agree to the change and he will become aware of the soundness of philosophy back of contemporary design. This will be a valuable lesson to him, and it will at the same time explain the fundamental underlying trend design, from architecture to automobiles. In the last named category, the current Continental Mark III is an example that proves the philosophy in its entirety.

Professional furniture and small furnishings do the same. Note particularly the beautiful simplicity of contemporary wooden trays and bowls. Note also, the rhythm and quiet in the best stainless flatware, and in fine glass. In these, material is glorified. All its hidden quality is outstanding, and yet its very superiority adds dignity and force to the primary function of which the outer form is the essence.

There are exceptions to the above philosophy, and though it would be less confusing at this time to disregard them, it may be well to name one of them in order to answer possible questioning.

Certain contemporary bowls, more often ceramic, are decorated with typically contemporary all-over pattern which is subdued in a way not to break the unity of the whole. The type of decoration and the method of application is usually the product of careful planning and much association with trend expression. Only by close living with the trend can one create in the spirit of the trend. Understanding then, comes through association.

It takes sense to avoid fires — dollars to pay their damages. — *National Safety Council.*

Carry only as much as you can see over. When you block your vision you might as well be blindfolded. If the load's too big, make two trips. — *Facts About Falls.*

Wax will not absorb into wood if a thinned coat of pure, white shellac is first applied to the bare, clean wood. The wax will then go farther and the wood will retain its natural color longer. — *Shellac Information Bureau.*

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

MEN AND STEEL

WORK on the St. Lawrence Waterway and power plants requires much labor, much capital, and much machinery and equipment.

According to "Steel Facts" published by the American Iron and Steel Institute, fifteen thousand men and seventy million dollars worth of machinery and equipment are engaged in cutting channels, building dams, canals and locks, power stations, and other construction work, all of which will require approximately 270,000 tons of steel products.

The result of this enormous expenditure of effort, money, and material will enable ninety per cent of the world's ships to land at cities that are more than twenty-three hundred miles inland. It is expected that in 1958 the world's second largest powerdam — 3120 feet long with 32 turbines and generators developing over two million horsepower — will be in operation.

About 70 per cent of the estimated steel requirements is for power plants. The Seaway in the United States and Canada together will utilize about 80,000 tons, while the power plant needs for both countries account for the remaining 190,000 tons.

Much of the most difficult work on the Seaway is in a ten-mile stretch of the river between Cornwall, Ontario, and Massena, New York. In that small area will be erected:

The St. Lawrence Powerdam, capable of producing 1,880,000 kilowatts;

The Long Sault Dam, controlling the water surface elevation at the powerdam;

The Long Sault Canal, including the Dwight D. Eisenhower Lock and Tunnel and the Grass River Lock; and

The Massena Intake.

The St. Lawrence Seaway Development Corporation of the United States is building the Long Sault Canal, one of the major units of the project. The canal will be ten miles long by 442 feet wide and will have a 27-foot minimum depth. The two navigation locks will each be 800 feet long by 80 feet wide by 30 feet deep. One report states that each lock will be able to lift a 25,000-ton ship 45 feet in eight minutes, removing rock shoals in the 68-mile Thousand Islands Section near Lake Ontario. The finished channel will be at least 27 feet deep with a minimum width of 450 feet. Canada is building the canals and dredging the channel for the Seaway in the Lake St. Francis, Soulanges, and Lachine Sections.

The United States and Canada are collaborating in the construction of the St. Lawrence Powerdam, approximately six miles downstream from Massena, New York. The two adjoining powerhouses, which in themselves will act as a gravity dam, span the channel between the eastern end of Barnhart Island in the United States and the Canadian shore. The powerhouses will contain 32 generators. According to the Power Authority of the state of New York, the maximum capacity of the 16 units producing power for the United States is approximately 940,000 kilowatts. The power dam is scheduled for completion by the end of 1959, but the first generation of power is scheduled in September, 1958.

The completion of the powerdam will require 44,000 tons of steel, 1.9 million cubic yards of concrete and approximately five years of work from the time construction started in September, 1954. In full operation, there will be 110 million gallons of water per minute falling a distance of 90 feet.

The 2900 foot long, 120 foot high Long Sault Spillway Dam is located about four miles above the powerdam. It is entirely within the United States, with one end on the New York mainland and the other on Barnhart Island. The Spillway has 30 vertical lift gates, each 52 feet wide and 30 feet high. The gates, stop logs and hoists together contain about 6625 tons of steel. There are also 8356 tons of reinforcing steel and 2717 tons of structural steel in the dam.

About 25 miles above the Long Sault Dam, Canada is building the 2800-foot Iroquois Control Dam and the Canadian Seaway Lock. This dam, containing about 22,100 tons of finished steel products, is necessary to regulate the outflow from Lake Ontario, and requires a bypass canal.

The Massena Intake will regulate the flow of water into the Massena Power Canal during and after the construction of the St. Lawrence Power Project. It is designed to permit a flow of domestic and industrial water to the village of Massena and to provide power for the duration of the construction period.

With the completion of the Seaway and the power projects on the St. Lawrence River, work will still remain to be done before cities at the western end of the Great Lakes become "seaports." Canada will deepen the channels in the Welland Canal linking Lakes Ontario and Erie. In the United States, the Great Lakes Connecting Channels must also be deepened to a minimum depth of 27 feet. Those channels, constructed and maintained by the Corps of Engineers, include the St. Marys River, Straits of Mackinac, St. Clair River, Lake St. Clair, and the Detroit River. The existing depths of those channels are 21 feet for upbound traffic and 25 feet for downbound ships.

The U. S. may not have launched a Sputnik to circulate our earth, but both Canada and the United States are progressing with a huge project that will do much for the people of the entire world.

OPPORTUNITY UNLIMITED — A NEW TV SERIES

WMVS-TV, Channel 10, is Milwaukee's newest television station. It went on the air October 28 at 5:00 p.m., with regular program operation.

It is operated by the Board of Vocational and Adult Education as a noncommercial station.

Dr. William F. Rasche, director and principal of the school, also is the director of this, the twenty-eighth educational station in the nation, and the second in Wisconsin.

Broadcast hours will be from 5:00 p.m. to 8:30 p.m., each weekday. The half hour from 5:00 to 5:30 p.m. will carry a network series produced jointly by the Educational Television and Radio Center in Ann Arbor, Mich., and the National Broadcasting Company.

The first program on Monday night, October 28, 1957, was on the International Geophysical Year. Tuesday's program was on Mathematics; Wednesday's on Greek mythology; Thursday's on Resources and Civilization; and Friday's on Current Affairs.

The live programming on a local basis will be through the co-operative efforts of the Milwaukee Vocational and Adult Schools, University of Wisconsin — Milwaukee, Marquette University, Milwaukee Public Schools, Public Library and Museum, and other agencies and groups.

Problems and Projects

COLONIAL STEP STOOL

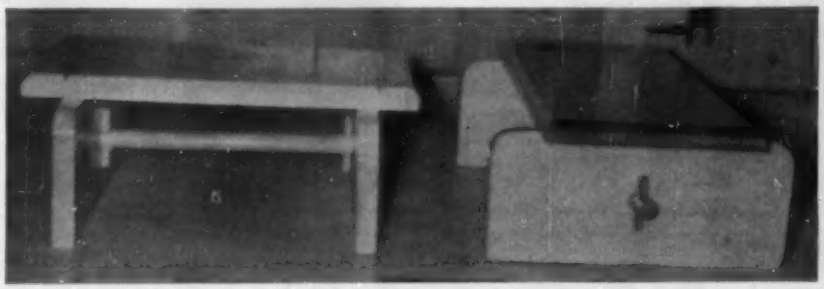
MICHAEL RHEA
Pacific Beach Junior High School
San Diego, Calif.

This step stool is an ideal project for beginning students. It can be made easier for the slower students or more challenging for the better students. In either case it incorporates the basic fundamentals of woodworking.

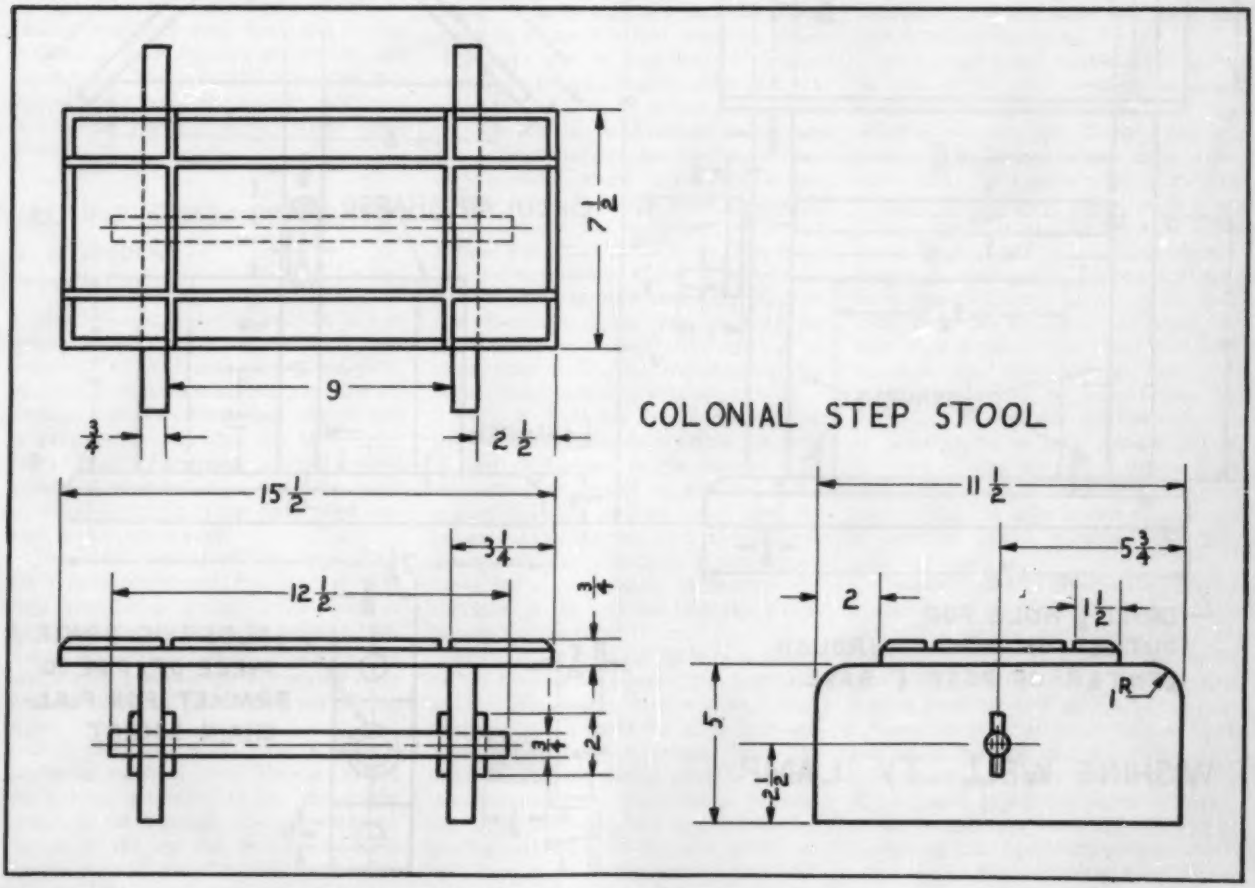
Although not shown here the top may be made plain with just a ¼-in. chamfer to relieve the design. The top is pine or mahogany with contrasting sides of pine or mahogany. The plain top would suffice for a student who did below average work on the sides. The average quality work would merit a top with saw kerfs, put in by the instructor on the table saw. For a real good job, up to this point, the student may be rewarded by being allowed to inlay the top. These qualifications must be explained when the project is first discussed and the necessary demonstrations are performed. Particular mention should be emphasized of the necessity in sanding the ends of the dowels before putting them in place.

In addition to being an excellent motivating factor, the simple inlay introduces the student to the basic principles of this fine art. The saw kerfs have a bonus advantage because they serve as guide lines to set the top straight. Most students are usually very impressed with the neat method of fastening the top to the sides. (Perhaps they anticipate challenging their parents to detect any visible indication of securing the top to the sides.)

When attaching the top, 6*d*. finishing



Colonial step stool



Details of the Colonial step stool

nails are driven through the saw kerfs and set below the surface. The nails are then concealed with strips of inlay material or wood dough, depending on the type of top. The sides of the step stool are made rigid with a ¾-in. dowel, and ⅜-in. dowel through it on both ends. Holes are bored from the top of the sides and through the dowel, *but no further*. An 8*d*. finishing nail is driven from the top and through the dowel and into the bottom half of the sides.

WISHING WELL TV LAMP

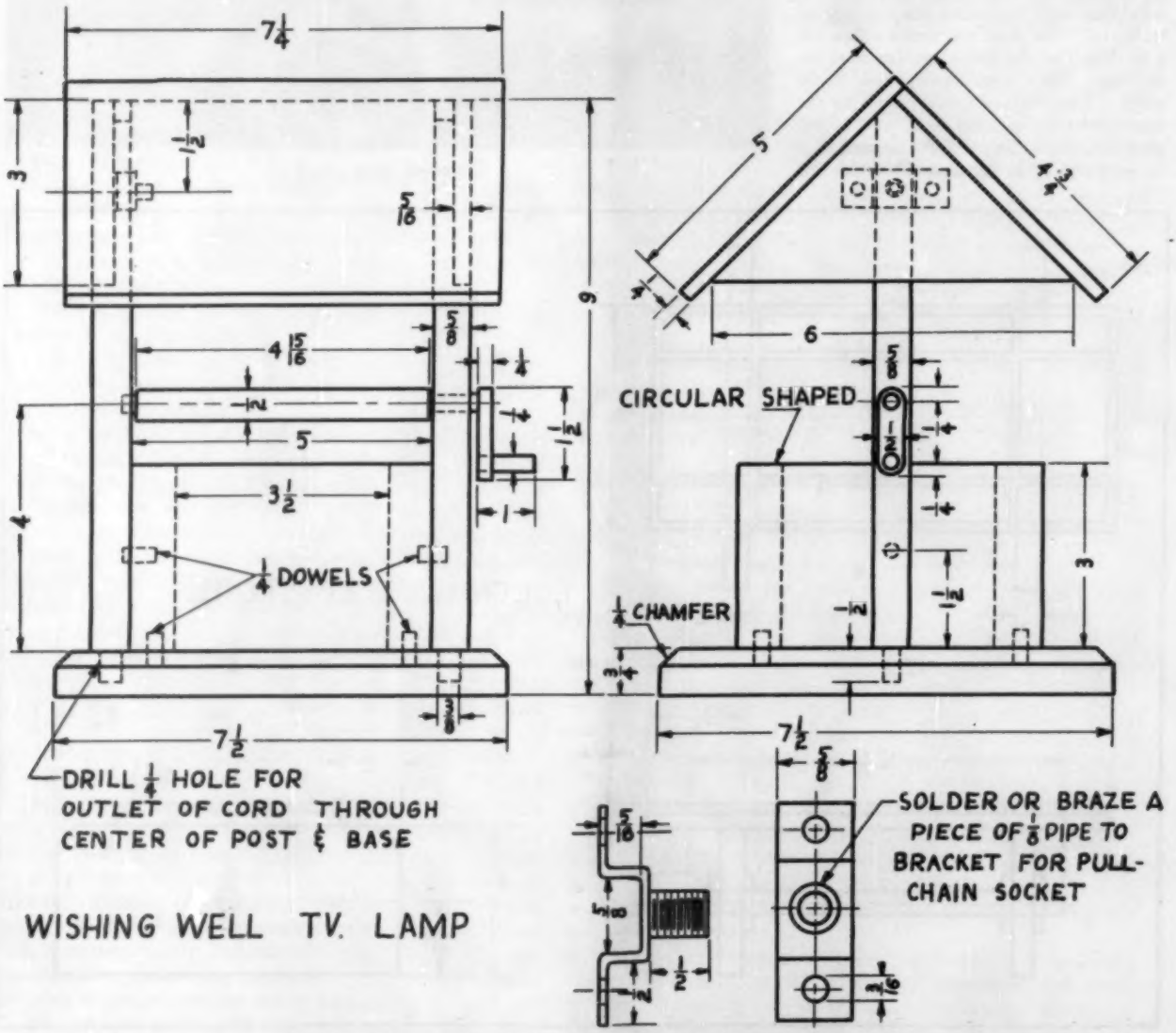
BROTHER LEO GEIGER, C.S.C.
Industrial Arts Department
St. Edward High School
Lakewood, Ohio

Lamps of all shapes and designs are used to supply the eye-protecting light for television viewers. The lamp herein described is in the form of a novelty "wishing well." Placed on the top of a television set, it will produce the necessary light using a bulb about the size of a Ping-pong ball.

Wishing well TV lamp

This project is ideal for a general shop project for it not only affords experience with woodworking but a little electric wiring and metalwork as well. A student with some fundamental background in woodworking should be able to produce this project with a few hints from the instructor. A more advanced student might find the assembly of the various parts a challenge for certain of the operations must be completed before complete assembly is possible. Some examples of this are:

1. The circular part of the well and the posts holding the roof must be assembled before the base is glued in place



Details of the wishing well TV lamp by Brother Leo Geiger

as the dowels holding the ring and the posts are at right angles to those on the bottom of the base.

2. The light cord must be pulled through the post and the base before these are glued if the cord is to come through the edge of the base. This is not necessary if the cord is brought through and notched on the underside of the base, however, this procedure is not the most desirable.

Small pieces of wood which lay around the shop collecting dust can be utilized in the project. All one type of wood can be used or a variety of woods for a contrasting effect might be preferred.

If all hand tools are used in its construction, this lamp affords a vast variety of operations. The crosscut, rip, and coping saws are needed; squaring and chamfering with the plane is required; a more than ordinary gluing and clamping job is necessary if the well roof is not nailed in place; there is drilling and doweling, the use of chisel, screw driver, compass, and measuring tools as well as the finishing processes when the construction part is completed. Of course the making of the metal socket bracket involves the use of hack saw, snips, soldering or brazing equipment plus a drill and countersink. The wiring required for the lamp is very elementary for it just involves a pull chain socket, a desired length of lamp cord, and a plug.

There is much learning packed into this small lamp. The individual instructor may devise short cuts or include additional steps if he wishes to stress certain operations.

ROUND CRIBBAGE BOARD

E. A. RERUCHA
Franklin Park, Ill.

Here is a project that may be a suggestion for a practical and useful gift item somewhat off the beaten conventional path. A round cribbage scoring board has the advantage over the conventional type in that it provides a continuous line of pegging holes. Pegging progresses entirely in one general direction, that is, along the curve of a spiral starting at the center and constantly moving outward.

The board consists of two wood disks, the top, or scoreboard, and the base. The base contains a pocket for a deck of cards and the storing of the pegging pins. Figure 1 shows the board ready for use and Figure 2 shows the top moved aside exposing the card pocket and peg storage space.

Both disks are made from hardwood, preferably maple or birch. They are turned on a lathe according to the dimensions shown on the drawings. The outer circumference of the top disk or score board is finished with stripes of two different colors of paint. The base is painted a solid color, the same color as the top stripe.

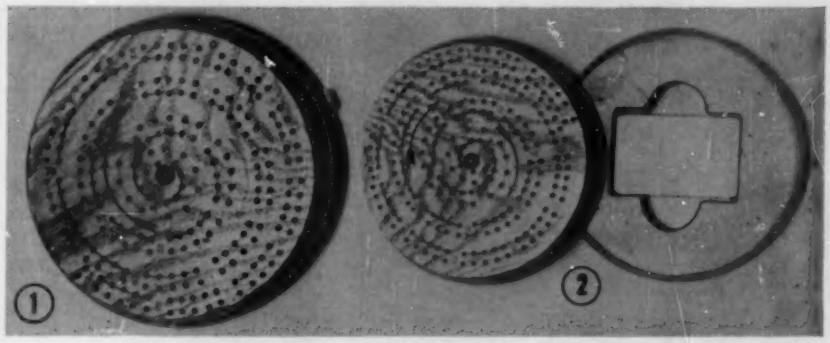


Fig. 1. The cribbage board ready for use. Fig.2. Cribbage board open showing pocket for deck of cards and pegs

Holes 1/8 in. in diameter are drilled at an angle into the semicircular openings in the base for storing the pegs. Drill the holes at least one half inch deep. Cover the entire opening in the base with a piece of cross-shaped tin using No. 18 by 1/2 in. flat head nails to fasten it along the edges of the opening. The tin overlaps the opening by 3/8 in. To obtain the shape and size of the piece of tin, lay the base on the tin and mark out the opening on the tin. Then cut 3/8 of an inch beyond the marked lines.

The layout of the board is shown in Figure 3. It is suggested that the double spiral in Figure 3 is first drawn on paper. The lines can be first located approximately by tracing along the sides of a wire spiral formed to shape so that it fits within a circle 6 3/4 in. in diameter. A piece of No. 10 insulated stranded wire whose overall diameter is about 1/4 in. may be used for the spiral. Form the spiral making the space between the beginning and second turn at the center about 1/2 in. This space may be increased to about 5/8 in. between succeeding turns until about the 90-point spot is reached. From there on bend the spiral gradually to reduce the spacing between turns until at the end the space between double spirals is only about 1/4 in.

Draw a circle 6 3/4 in., in diameter on paper and locate the spiral within the circle so that the margin on the outside is as near equal all around as possible. Trace around the wire on both sides, thus obtaining both of the lines of a double spiral. Trace over the lines using a draftsman's curve for a guide so as to improve the curvature of the lines and to obtain a continuous flowing curve.

Mark off the holes on the lines in groups of five by drawing a pencil line from hole to hole. The spacing between holes in each group of five is about 5/16 of an inch and about 1/2 in. between groups. Since the inside line of the double spiral is shorter than the outer one, the spacings between the holes must be slightly less, and the beginning and last hole in each group, on both lines of the double spiral, should fall on a line drawn from the center of the board and cutting across the lines as shown in the drawing. It may be necessary to do some juggling about of the hole locations and to vary somewhat from the general dimensions given above. The idea is to obtain spacings that appear properly to the eye although they may vary by a small decimal fraction of an inch.

When all holes and group spacings are located cut out the paper circle along the circumference and paste to the top disk or score board. When dry center punch carefully all holes with a sharp punch. Drill 1/8-in. holes one half inch deep. After drilling remove the paper and finish surface with fine sandpaper.

With a soft pencil redraw lightly groups of lines on the board so that you do not become confused when painting in the lines which is the next step. Using a fine hair brush with fairly long bristles and a draftsman's curve for a guide paint in the lines using a different color paint for each line of the double spiral. Use the same colors as on the base and for the circumference stripes on the top disk. Support the curve on a block of wood about 1/8 in. thick away from the surface of the board and start on one side of the board and move across to the other side as you paint rather than trying to follow along the spiral. In this way you will not be trying to paint above an area already painted over and running the risk of smearing the lines. Also paint in the center spot and circle. When the paint is dry apply a coat of clear flat varnish to entire board, both sides and edge.

The next step is to letter in the numbers and arrows. Black drawing ink is used for both. The arrows are drawn using the draftsman's curve as a guide. When the ink is dry give the entire board another coat of clear flat varnish.

When dry turn both disks up side down and center the base on the bottom of the score board so that the counter sunk hole in the base is on top and above the widest margin between peg holes and the edge of the scoring disk. Locate the position of the pilot hole for the assembling screw on the bottom of the disk by placing a No. 8 nail in the hole and tapping it with a ham-

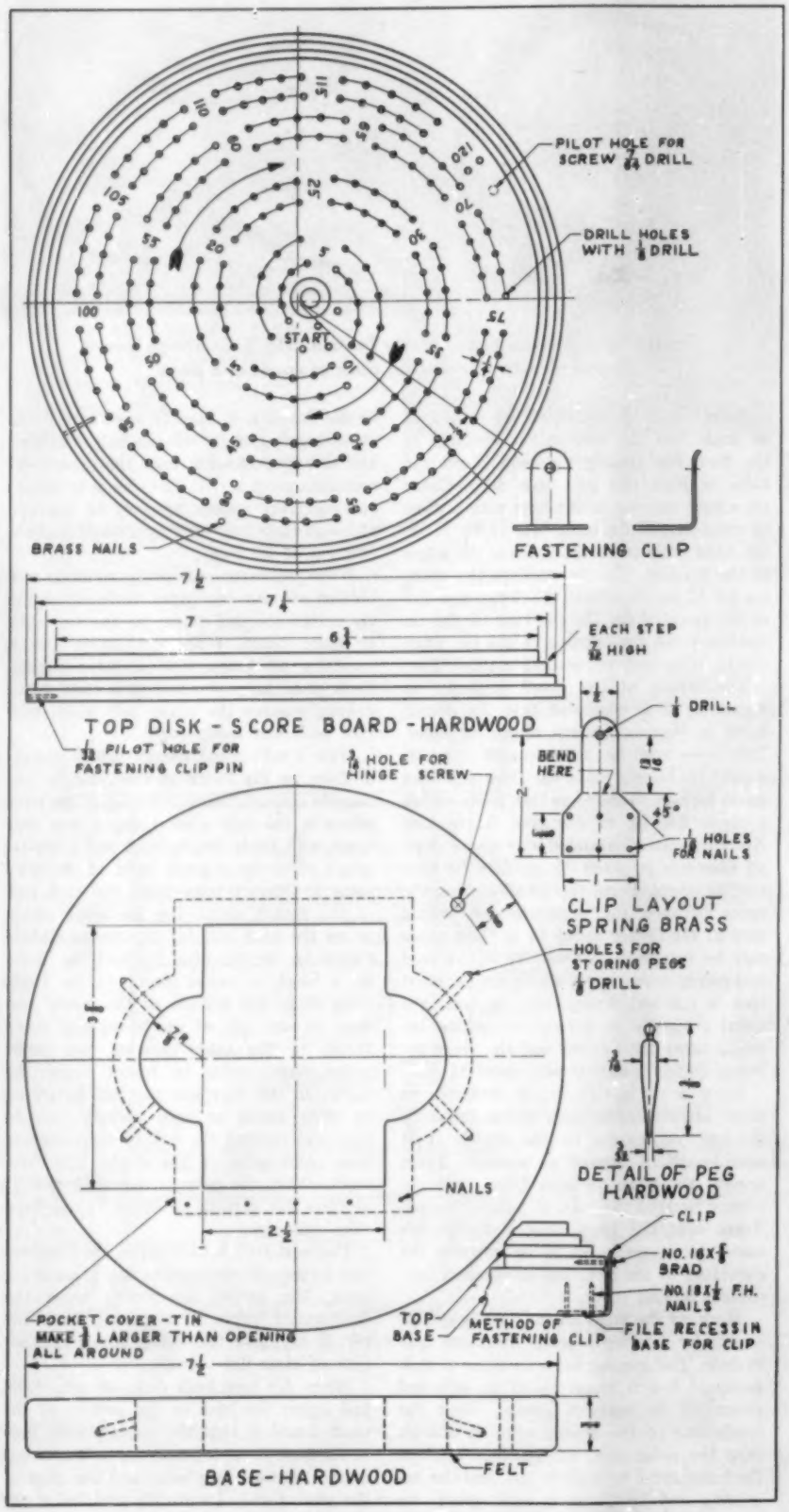


Fig. 3. Details of the top disk and base of the cribbage board

mer. Drill a 7/64-in. pilot hole for the screw. Attach disks together with a No. 8 by 1¼ flat head wood screw so that they fit snugly together but still can be separated by sliding over each other in opposite directions.

Drill 1/16-in. pilot holes and drive in two round head brass nails (escutcheon pins) ½ in. long on each side of the number 90 as shown in Figure 2. Attach the fastening clip directly opposite the hinge screw. Attach clip to bottom first with No. 18 by ½-in. flat head nails. Then with the top properly centered over the base locate the position of the pin engaging the clip. The pin is a No. 16 by 5/8 in. brad. Glue a piece of felt to the bottom and the job is complete except for the pegs. These may be turned to the size and shape shown in Figure 2, out of a piece of hardwood dowel rod. Metal pins may be made by cutting lengths of No. 8 finishing nails 1¼ in. long from head to cut. Round off the cut end. Paint each pair of pegs with one of the colors previously used. Each player or scorer will select a pair of pegs and peg his score along a spiral of a similar color on the board.

LIST OF MATERIAL

1 Piece hardwood 7/8 by 8 in.
1 Piece hardwood 3/4 by 8 in.
1 Piece tin 3½ by 4½ in.
40 No. 18 by ½ in. flat head nails
1 Piece No. 20-ga. spring brass 1 by 2 in.
2 Brass nails, round head, about No. 18 by ½ in.
1 Brad No. 16 by 5/8 in.
1 Piece felt 7¼ in. diam.
1 Piece dowel rod 5/16 by 8 in. or 4 No. 8 finishing nails for pegs
1 No. 8 by 1¼ in. flat head wood screw
Paint or enamel
Varnish

PLASTIC TUMBLER LAMP

ALVIN R. LAPPIN
Assistant Professor of Industrial Arts
San Jose State College
San Jose, Calif.

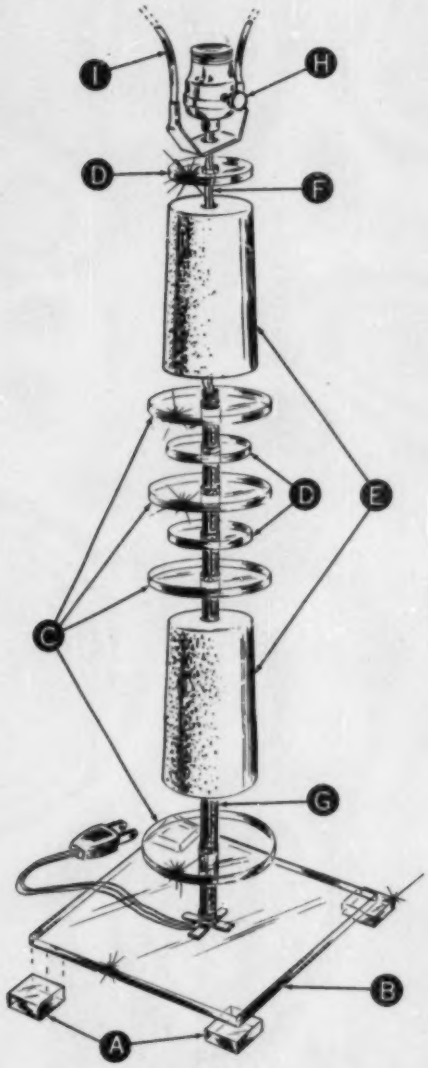
This novelty table lamp is composed of two plastic drinking tumblers, seven plastic disks, a square base, and four square feet. The result is a lamp which is certain to be welcomed into the home where modern furnishings are in use.

Material Required:

Part

A 4 pieces clear acrylic plastic, 3/8 x 1 x 1, feet
B 1 piece clear acrylic plastic, ¼ x 7 x 7, base
C 4 pieces clear acrylic plastic, ¼ x 3½ dia., large disks
D 3 pieces clear acrylic plastic, ¼ x 2⅜ dia., small disks
E 2 green-colored plastic tumblers, approximately 2⅜ dia. at base, 2¾ dia. at top, 5½ tall.
F 1 electrical cord

G 1 pipe, ⅜ dia. by 14, one end threaded. NOTE: Pipe may need to vary in length depending on length of plastic tumblers.
H 1 electrical socket
I 1 harp, 8-in.
1 finial
1 green-colored coolie-type lamp shade, 19-in. dia.

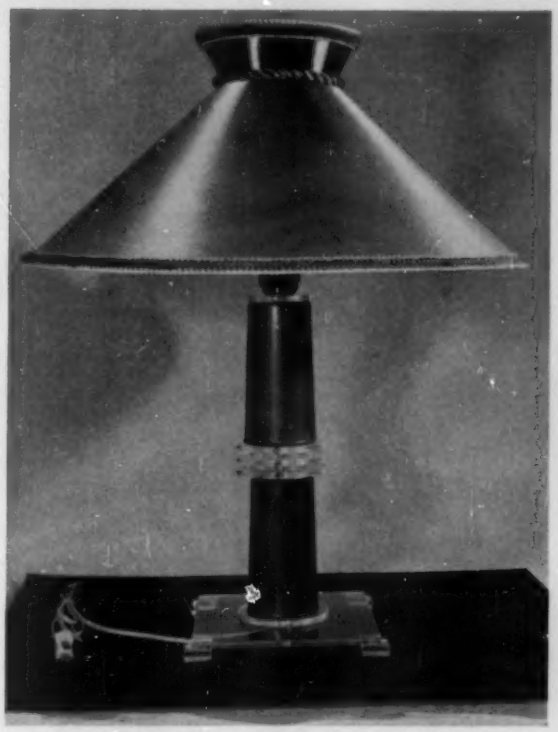


Layout of plastic tumbler lamp. Letters on layout refer to parts listed under "Material Required."
— Drawing by A. Charles Tyler

Procedure for Making:

1. Lay out four 3½ dia. circles, and three 2⅜ dia. circles on ¼-in. material.
2. Drill a 7/16 hole at center of each circle.
3. Saw circles to shape.
4. Sand and buff all edges, or mount all pieces of same size on a wood dowel, center between spindles on wood turning lathe, and turn, sand, and polish.
5. Cut material for base and feet.
6. Sand and buff all edges of these parts.
7. Drill a 7/16 hole at center of base.
8. Cement feet to base.
9. Drill a 7/16 hole at center of each tumbler.
10. If plastic tumblers are transparent, hand sand, or preferably, sand-blast to a frosted appearance.[1]
11. Saw two cuts ¾ deep at end of pipe opposite threaded part.
12. Spread cut parts four ways.
13. Assemble parts on pipe as shown in the layout.
14. Attach electrical cord.
15. Attach shade in place with finial.

[1]Alvin R. Lappin, "Sandblaster for the School Shop," *Industrial Arts and Vocational Education*, December, 1954, 339.



Plastic tumbler lamp

Related Information:

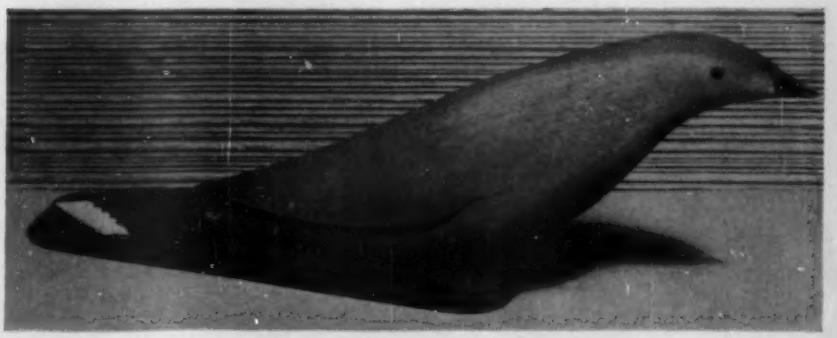
Layout
Sawing
Sanding
Buffing
Drilling
Sandblasting
Using hypodermic for applying cement.[2]
Wiring a lamp

[2]Alvin R. Lappin, "Using a Hypodermic Syringe to Cement Acrylic Plastic," *Industrial Arts and Vocational Education*, May, 1951.

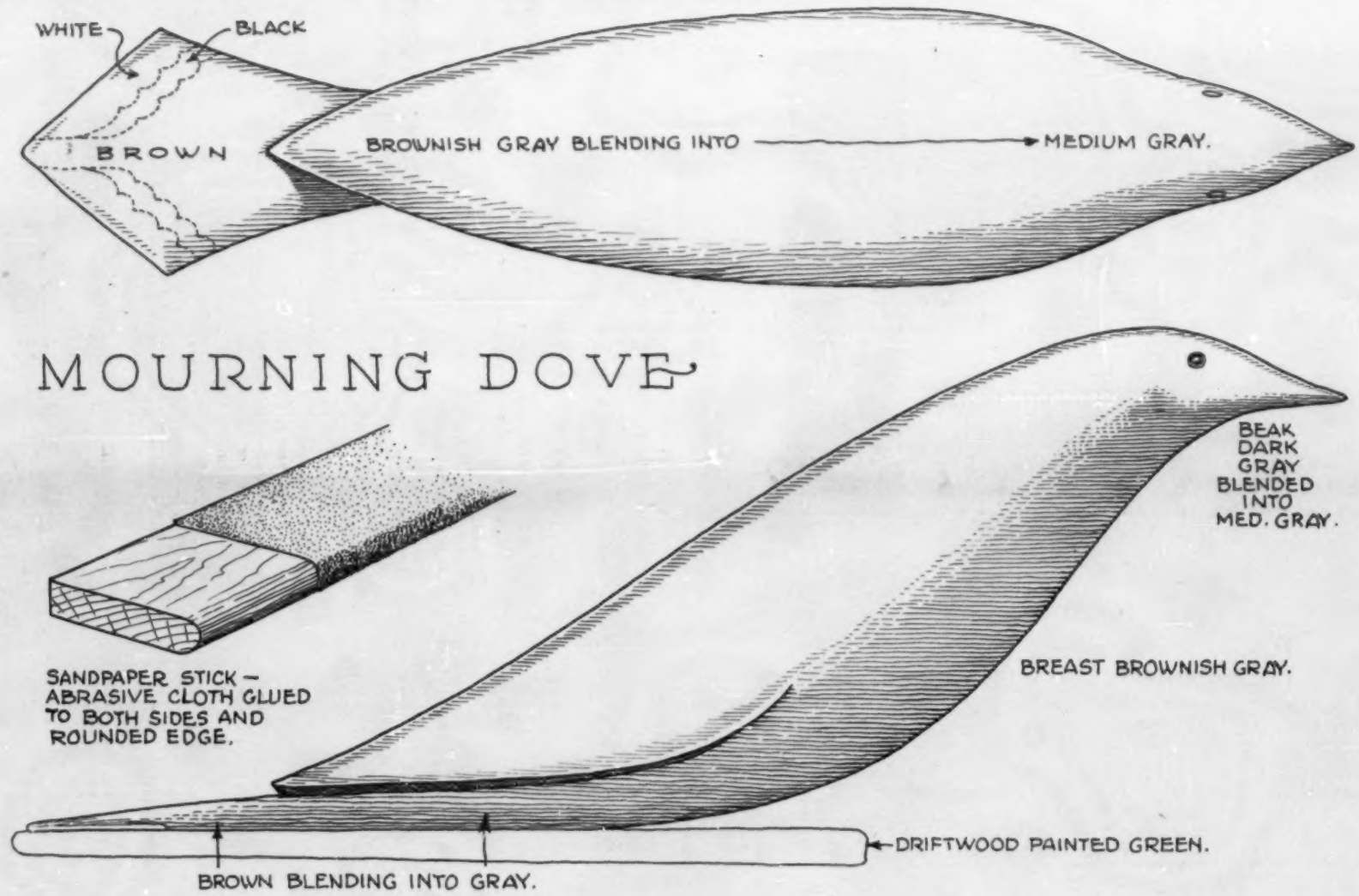
WHITTLING PROJECT — MOURNING DOVE

BEN HUNT
Hales Corners, Wis.

This very much stylized bird is quite



Mourning dove by Bent Hunt



Detail drawing of mourning dove

easy to whittle and to paint. The blank or silhouette block can be sawed two ways, thereby saving a lot of time. The body is whittled quite round and the tail quite flat with the top or upper surface slightly rounded.

The best way to sand objects of this nature is to use a "sandpaper" stick, although abrasive cloth lasts longer. The abrasive cloth is glued over a piece of ¼-in. crate lumber, one edge of which is rounded, as shown in the sketch. Use a quick drying cement or glue. With this stick it is an easy matter to get a nice even surface. One stick with coarse abrasive and another with a finer one, say 180 grit. The final sanding is done with fine sandpaper rubbing with the grain of the wood.

Before painting with water color, dampen the wood with lukewarm water to raise the grain. When dry, sand it down again.

Blending water colors, as is done in this case, is best done by dampening the wood, painting over the damp surface. This prevents brush or lap marks.

Start at the beak and work toward the tail. Use a medium gray and add a little brown on the breast and toward the ends of the wings. This is where the camp wood helps out.

The tail is painted as indicated in the sketch, with brown, black, and white. Note where blending of brown into gray is done. The final finish may vary. Some like just a couple of light coats of some plastic can spray, and some prefer a high gloss finish to represent a piece of ceramic. In that case two or three coats of clear lacquer is used, either sprayed on or brushed on.

For a base I usually use a flat piece of driftwood. In this case, painted green to contrast the rest of the bird. Fasten with glue and a couple of small brads.

ORIENTAL CHOPSTICKS

CAPT. ROBERT W. INNIS
On-The-Job Training Staff Officer
Castle AFB, Calif.

Chopsticks similiar to those pictured here, are much more popular in the orient than are knives, forks, and spoons. American shop students find the chopsticks an excellent one-evening project as they are easy to make and the whole family can join in the fun of trying to eat with them. The sticks are made of hardwood sanded smooth with corners sanded round. No finish is needed; however, wax may be used if desired.

Oriental chopsticks

SHEET METAL WALL TIES and/or PAINT PADDLES

B. HARRY GUNDERSON
Chairman, Industrial-Arts Division
Northern State Teachers College
Aberdeen, S. Dak.

Sheet-metal cuttings will accumulate in school shops. Some of the small pieces may subsequently be used for parts fabrication but the continued storage of many small cuttings often creates problems that are trying for satisfactory "housekeeping." The general demands for sheet-metal stock will, with job and problems analysis, help determine the quantity of cuttings to keep on hand.

The small sheet-metal cuttings not needed for the near-future project or problem construction may be recut into the sizes required for masonry *wall ties*. The usual size required for the standard wall tie is ⅞ by 6⅞ in. See Figure 1. The width dimension may vary down to the minimum of ⅝ in. Galvanized iron is preferred in gauges from 28 to 22 inclusive.

Specifications

There is an excellent market for wall ties that meet minimum specifications, which are:

1. Metal with a protective coating — galvanized iron, gauges 28, 26, 24 and 22.
2. Holes punched for wall tie and/or masonry tie as shown in Figure 1.
3. Surface corrugation (in school shops the corrugating may be made with a light crimping operation using the crimping machine, preferably two passes to keep metal from bowing).

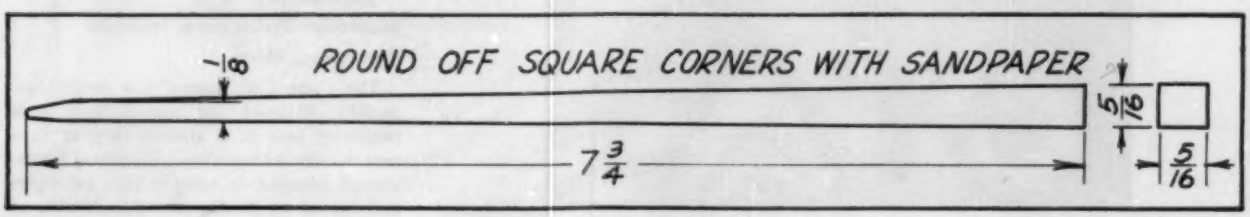
Market and Use

Local material handlers (wholesalers) will pay about $5 per thousand for the wall ties that meet standard specifications. Money so collected may be placed in a petty cash fund from which small miscellaneous (often forgotten) items may be purchased. If local regulations do not permit a petty cash fund for the shop the amounts from the sale of wall ties will help reinforce the general industrial-education account.

The pieces that do not meet the specifications for wall ties may be used in the shop as paint paddles. If used for paint paddles, the crimping (corrugation) may be omitted with the possible addition of a hem on one side or on both sides to help stiffen the metal for the heavier mixing operations.

Procedure for Making Wall Ties

1. Cut to length dimension with squaring shear (all pieces on hand).
2. Cut pieces made from step No. 1 to width dimension.
3. Punch 2$\frac{3}{16}$-in. holes.
4. Punch $\frac{3}{32}$-in. hole.
5. Corrugate by running piece through crimping machine. The medium crimp will bow piece slightly.
6. Corrugate other side by running piece through crimping machine with the same machine setting. This second pass will straighten the piece. See Figure 2.



Details of the chopstick

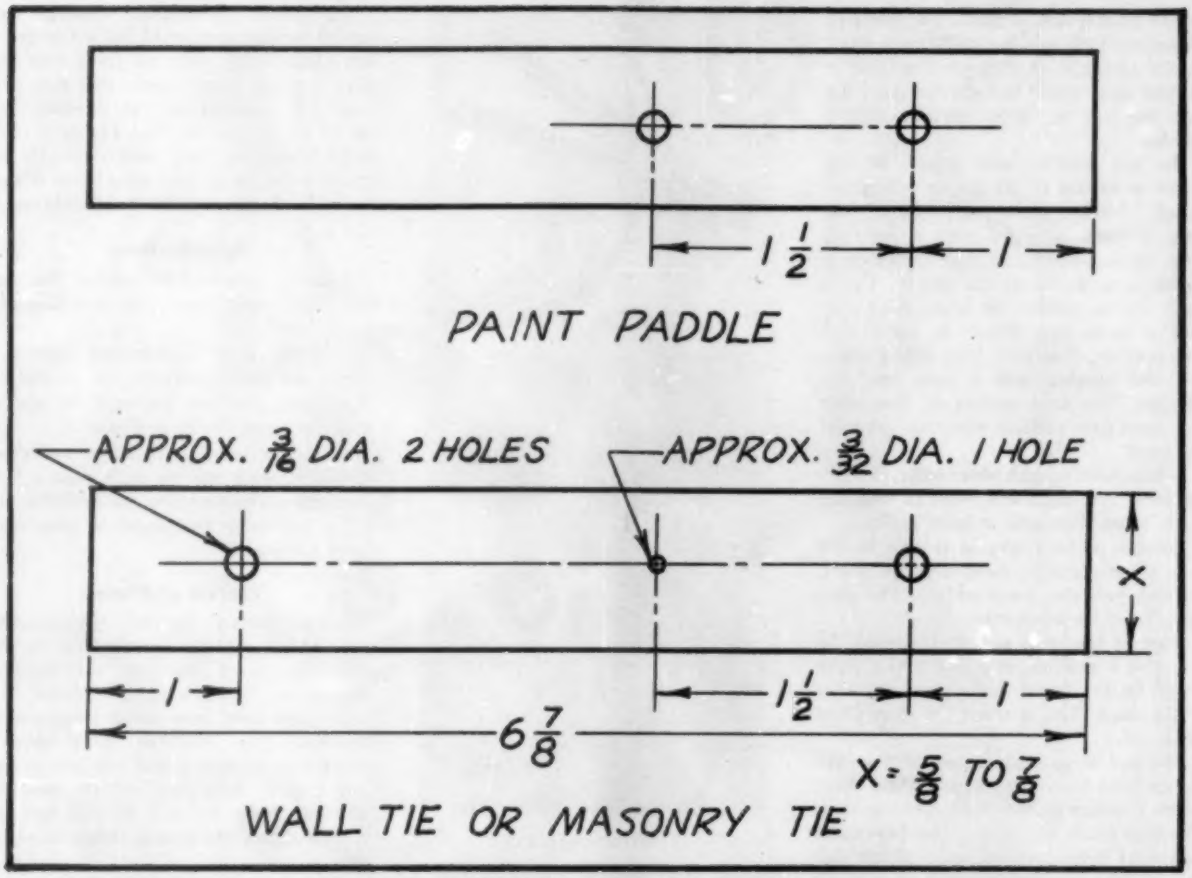


Fig. 1. Paint paddle and wall or masonry tie

Fig. 2. Crimping: second pass. Ties: bundled; punched; crimped

7. Bundle in packages of 100 for ease of handling.

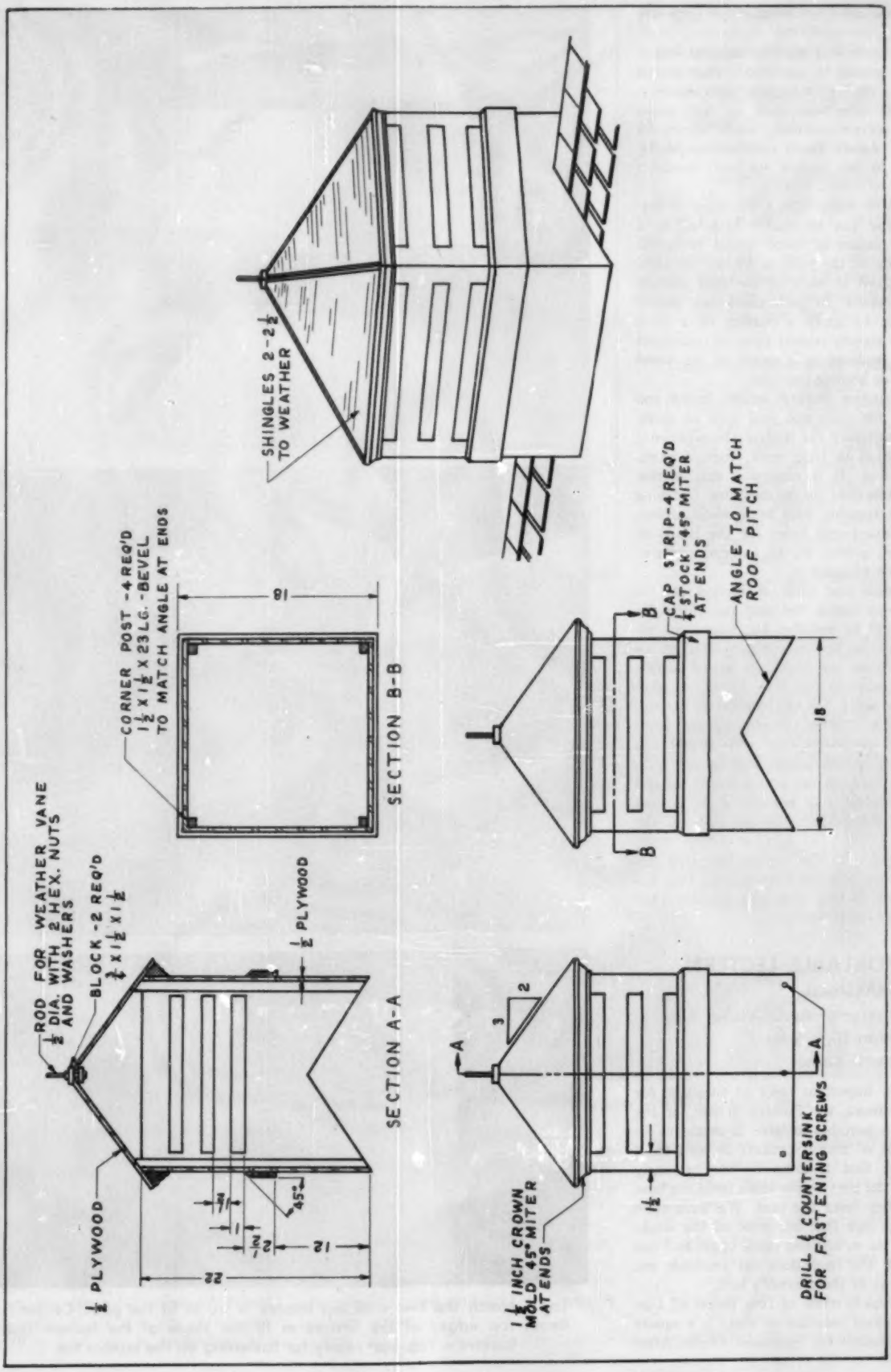
Procedure for Making Paint Paddles

1. Rejected pieces for masonry wall ties may be made up as paint paddles.
2. Punch 3/16-in. holes at the 1-in. and 1½-in. locations shown in Figure 1.
3. For light paint mixing, make 3/16-in. fold on one edge on piece using bar folder.
4. For heavy paint mixing, make 3/16-in. fold on both edges on piece using bar folder.
5. Store paint paddle in handy location for paint mixing operation.

CAPE COD CUPOLA

HERBERT W. YANKEE
Assistant Professor of Mechanical Engineering
Worcester Polytechnic Institute
Worcester, Mass.

The Cape Cod cupola is a project especially designed for manufacture in a carpentry area of a general shop or in a unit woodworking shop. It offers fundamental practice in construction principles and serves to modify the possibilities of teaching carpentry where size and space



Cape Cod cupola designed by Herbert W. Yankee

restrict the construction of larger carpentry projects.

The cupola will lend its colonial charm and add greatly to appearance when placed upon the roof of a garage or breeze-way, on small structures such as real estate offices, service stations, small stores, or roadside stands. Great interest can be developed in this project for both in-school and out of school making.

It can be made with a minimum of materials and can be readily attached to a roof by means of wood screws from the slope side of the roof or by use of angle irons placed at each of the four corners of the cupola. In both cases care should be taken to apply a coating of a good grade of roofing cement so as to counteract possible leakage as a result of the wood screws for holding purposes.

Construction features include layout and framing for sides and roof with an excellent opportunity for students to experience construction in trim work, cornice work, and roofing. It is suggested that marine plywood be used for the sheathing, fastening all parts together with brass wood screws. The counterbored holes for the heads of the wood screws on all exterior surfaces should be plugged.

Materials and color of roofing can be selected to match the roof on which the cupola will be installed but interesting effects can be had by proper selection of roofing colors and materials. Actual roofing shingles provide for 2 to 2½-in. weather exposure on a full scale roof. It is suggested that roofing shingles be cut down for this purpose. This will enable the builder to utilize scraps and cutoffs from shingles used on an actual house as well as to control the proportion of roofing shingles with respect to the scale of the cupola.

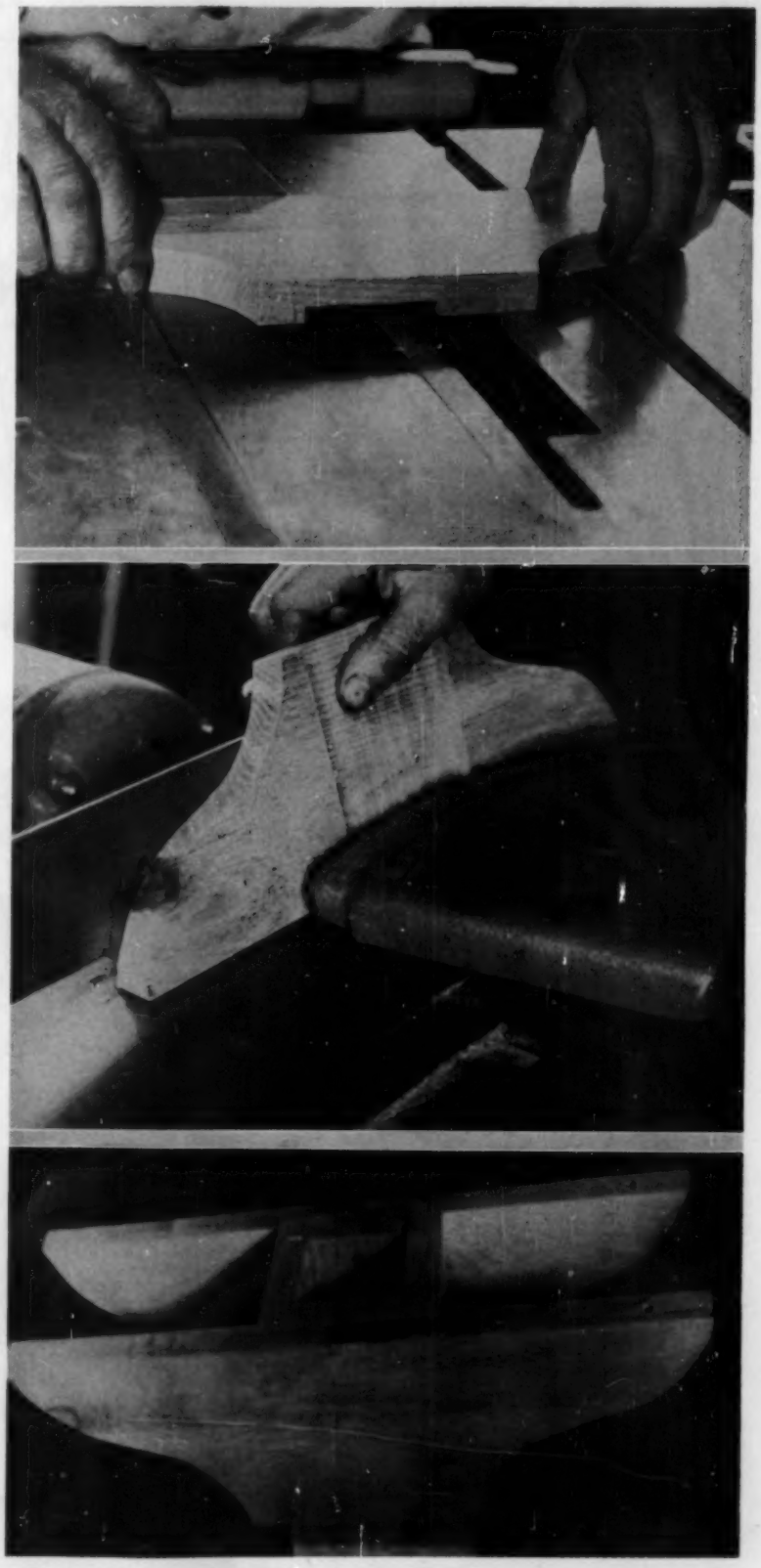
The peak of the cupola has been designed with a small flat section. This has been done so that a suitable weather vane can be added if desired.

PORTABLE LECTERN

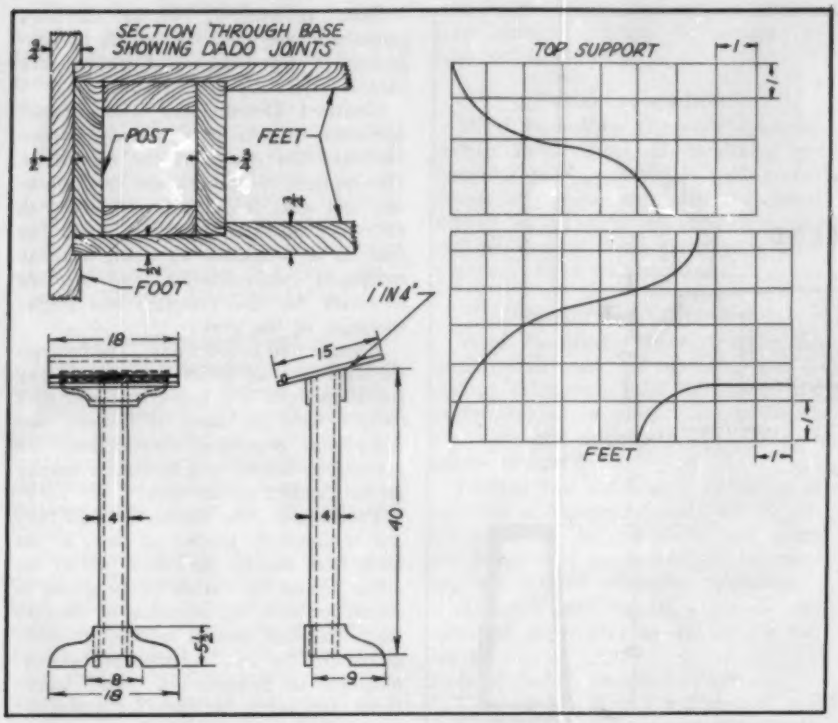
D. C. MARSHALL
Co-ordinator of Audio-Visual Aids
Manhattan High School
Manhattan, Kans.

A very important piece of furniture for the classroom, the Sunday School, or the club is a portable lectern. It seems to be the habit of many speakers to lean on it so much that it must be very strongly built or the post comes loose from the base or the top from the post. We have tried to design one that has none of the weaknesses that makes one come apart and one in which the base does not protrude out in the way of the speaker's feet.

The post is made of four pieces of 1-in. lumber glued together to make a 4 square column, hollow for decreased weight. After



Top — Notch the feet and top braces ¼ in. to fit the post. Center — Bevel top edges of the braces to fit the slope of the lectern top. Bottom — Top post ready for fastening on the lectern top



Detail drawing of the portable lectern

gluing, it is cut to length and the angle cut on the top end to give it the proper slant. The pieces for the feet and top braces are cut to size and ¼-in. dadoes, ¼ in. deep are cut on them to make a notched joint to fit on the post. After the dadoes are finished, the curves are cut to shape and sanded on a drum sander. The top is cut to size and a ⅜-in. groove is plowed near one edge to receive a retaining strip that holds books from sliding off. After all parts have been sanded it is ready to be assembled.

The feet and top braces are glued on and then are reinforced with screws from the inside of the post. The top is fastened to the top braces with screws from underneath through the ends of the braces. The finish should match the furniture of the room where it is to be used and the last two coats are of spar varnish rubbed down with oil and pumice stone to give a soft luster.

BOOKHOLDER

M. L. TANCO
Waukegan, Ill.

Tools and Equipment

Rip and crosscut saw; jack plane; pencil and try square; No. ½ garnet coarse and No. 3/0 aluminum oxide fine; hack saw; metal file; scriber, rule, and try square; metal vise and ball-peen hammer; awl, try square, and punch; drill press; metal file; rag and benzine; brush and lacquer.

Steps in Making the Project

1. Cut ¾-in. poplar to size.
2. Plane all surfaces and edges.
3. Lay out holes in poplar.
4. Sand all surfaces and edges.
5. Cut ¼-in. square metal to size.
6. Bevel all ends of metal.
7. Mark bend positions.
8. Bend (heat metal or bend by hand).
9. Cool metal by dipping in water.
10. Lay out holes.
11. Drill ⅛-in. diameter (metal bit) holes.
12. File burrs around holes.
13. Clean metal.
14. Dip or brush metal with metal lacquer.
15. Allow thirty minutes to dry.
16. Apply finish to poplar.
    a) Use shellac as a base (dry for two hours).
    b) Rub down with fine steel wool and dust.
    c) Brush on clear gloss varnish.

A group of third graders visiting a print shop

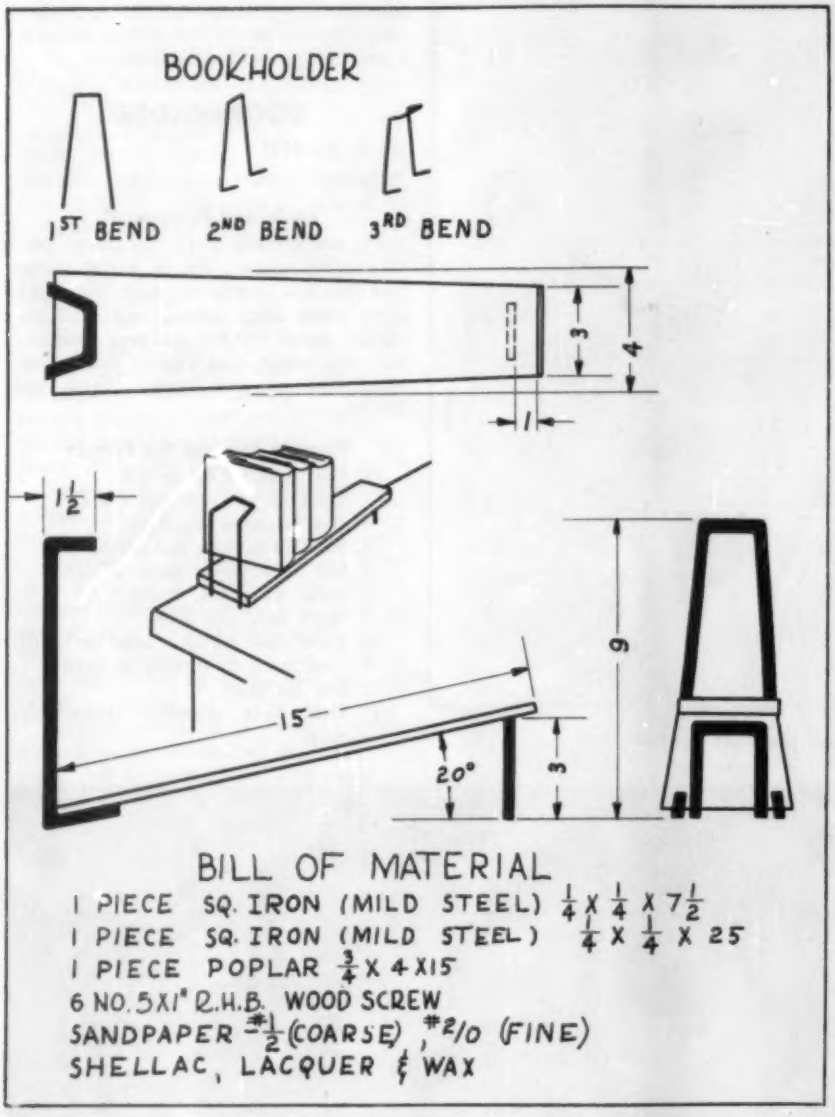
THIRD GRADERS VISIT A PRINT SHOP

ERNEST J. LEAL
Draper High School
Schenectady, N. Y.

The illustration shown herewith records a visit by Mrs. Mary Nolan's third grade class of the Draper Elementary School, Schenectady, N. Y., to the print shop while on a field trip in connection with their study of forms of communication. They were shown on a small scale, composition, typesetting, lockup and printing by the instructor, Ernest J. Leal of the Draper High School faculty.

Also shown were examples of linotype, photoengraving, wood, and linoleum cuts, each of these being discussed in the chronological development of the printing industry of today.

Each child was provided with the opportunity of operating the 3 by 5-in. Kelsey press pictured in the background to print a small memento of their visit.



Detail drawing of the bookholder

d) Rub down lightly with steel wool.
e) Wax.

17. Assemble.

TYPICAL SPECIFICATIONS FOR A RESIDENCE—I

N. M. PITTMAN
Leveretts Chapel High School
Overton, Tex.

The residence is to be built for .... *Owner*, residing at (*Number*)..... (*Street*) .... (*City*) (*County*) (*State*) and is to be built upon the owner's property located as described below: ....

....

Location of House on Lot: The location of the house shall be as shown and dimensioned on the Plot Plan included in the working drawings.

General Conditions of the Specifications

General Description of the Work: The contractor shall supply all labor, material, transportation, temporary heat, fuel, light, equipment, scaffolding, tools and services required for the complete and proper finishing of the work in strict conformity with the drawings and specifications. Work of all trades included in this job shall be performed in a neat and workmanlike manner equal to the best in current shop and field practice.

Bids: In receiving bids for the work specified herein, the owner incurs no obligations to any bidder and reserves the right to reject any and all bids.

Contract Documents: The contract documents consists of the *drawings, specifications, Plot Plan,* and the *Agreement.* The contract documents are complementary and what is called for by one shall be as binding as if called for by all. The contract is to include all labor, material, equipment, transportation, and handling necessary for the complete and proper execution of the work.

Permits and Inspections: The contractor shall give all notices, secure and pay for all permits and inspections and shall comply with all laws, ordinances, and regulations governing construction, fire prevention, health, and sanitation bearing on the conduct of the work.

Protection: The contractor shall fully and continuously protect all parts of the work from damage, and shall protect the owner against all loss or injury arising in connection with the execution of the contract. He shall protect adjacent property as required by law, and shall provide and maintain all passageways, guard fences, lights and other facilities for protection as required by public authority or local conditions. The contractor shall protect all trees, shrubs, walks, and curbs from damage during building operations. The owner shall provide adequate fire and tornado insurance during construction.

Contractor's Liability Insurance: The contractor shall insure himself against claims under Workmen's Compensation Acts and from all other claims for damage for personal injury, including death, which may arise from operations under this contract, whether such operations be by himself or by any subcontractor or by anyone directly or indirectly employed by either of them. Certificate of such insurance shall be furnished and shall be subject to the owner's approval.

Cash Allowances: All cash allowances specified shall be included in the contract sum. If the owner's selections total more than or less than the specified allowances the contract sum shall be adjusted accordingly.

Extra Work: Work shall not be started on any item not included in the plans, specifications, and contract until the owner and the contractor agree in writing to the specific quantity and quality intended and to the cost of the extra work. Owner and contractor shall operate in strict conformity with this requirement for their mutual protection.

Cleaning: The contractor shall at all times keep the premises free from accumulations of waste materials and rubbish and at the completion of the work, all rooms and spaces shall be left broom clean.

Work Not Included: The following items of work are excluded from the contract, however, they shall be included if noted under "Special Items Included" at the end of this specification:

Blasting, Subsoil Drain, Waterproofing, Driveways and Walks, Finished Grading, Planting, and Landscaping, Fences, Furniture and Furnishings, Heating Plant, Venetian Blinds, Window Shades, Refrigerator, Cooking Range, Bathroom Accessories, Weather Stripping, Automatic Washer, Automatic Drier.

Excavation and Grading

(The general conditions of the specifications apply to the following sections.)

Work Included: The work under this section shall consist of furnishing and installing all material and equipment and performing all necessary labor to do all masonry work shown on the plans or specified.

Footings: Footings shall be of concrete mixed in the proportions of 1 part Portland cement, 3 parts of clean, coarse, sharp sand free from loam or vegetable matter, and 5 parts of ¾-in. gravel. Concrete shall be machine mixed with clean water to the proper consistency and shall be placed immediately after mixing and thoroughly puddled into the forms. Contractor shall check bearing power of soil in all cases and construct footings of sufficient size to conform to local soil requirements and building codes.

Walls: Concrete block foundation walls where shown shall be of size and quality permitted by local building codes. Blocks shall be thoroughly wetted before laying and shall be laid in a full bed of mortar. Both ends of each bock shall be buttered and pushed up against the adjoining unit. Mortar joints shall be thoroughly filled with cement mortar. The blocks above grade and to a depth of 6 in. below grade and around area openings shall have a cement finish. Fill voids in top course of foundation blocks with concrete.

If poured concrete foundations are used in place of concrete blocks, the concrete walls shall be of sizes required by local conditions and codes, and mixed in the proportion of 1 part Portland cement, 2½ parts of clean, coarse, sharp sand free from loam or vegetable matter, 4 parts of ¾-in. gravel, to which has been added not more than 1 cu. ft. of hydrated lime to each 5 cu. ft. of cement. Concrete shall be mixed and placed as specified under footings. The concrete above grade and to a depth of 6 in. below grade shall be rubbed to a smooth finish.

Waterproofing: No waterproofing is required unless specified under "Special items included."

Concrete Stoops and Steps: Lay 5-in. reinforced slabs on garage and terrace floors, stoops, and steps as detailed.

Chimney: If required, furnish and install heater flue or Underwriters Laboratory approved chimney as accepted by local building code.

Miscellaneous Iron

Work Included: The work under this section shall consist of furnishing and installing steel reinforcing and anchor dowels for concrete walls, slab, and stoops. Provide anchor bolts with angle clips, nuts and washers for metal areaways if areaways are shown on the plans.

Framing and Carpentry

Work Included: The work under this section shall consist of furnishing and installing all material and equipment, and performing all necessary labor to do all the framing, carpentry, and millwork shown or specified.

Cutting and Patching: No cutting or patching of framing members will be permitted except by permission and under the direction of the contractor. All members cut shall be thoroughly reinforced.

Girder Posts: Girder posts of size noted on plans shall be one of the following:

1. No. 2 or Btr. Douglas fir S4S
2. No. 2 or Btr. West Coast hemlock S4S
3. No. 2 or Btr. Southern yellow pine S4S

Girders: Girders of size noted on plans shall be built up of one of the following:

1. No. 2 or Btr. Douglas fir S4S
2. No. 2 or Btr. West Coast hemlock S4S
3. No. 2 or Btr. Southern yellow pine S4S

Individual members of each girder shall be staggered so that girder will be continuous over supports, but in all cases the joints must occur over posts. Girders shall be stagger nailed 9 in. o.c., set with crown edge up with full bearings at ends and intermediate supports. At wall ends of girder lay hard burned brick or steel bearing plates making a true level bearing allowing 1 in. air space around sides and ends.

Floor Joists: Joists of size and spacing noted on the plans shall be one of the following:

1. No. 2 or Btr. Douglas fir S4S
2. No. 2 or Btr. West Coast hemlock S4S
3. No. 2 or Btr. Southern yellow pine S4S

Joists shall be set with crown edge up with full bearing at supports. Double joists under partitions paralleling run of joists. Where pipes and ducts are to be placed in partitions, double joists shall be placed 5½ in. apart with solid bridging every 2 ft. Joists shall lap each other over girder and shall be securely nailed together and to girder.

Ceiling Joists: Joists of size and spacing noted on plans shall be one of the following:

1. No. 2 or Btr. Douglas fir S4S
2. No. 2 or Btr. Southern yellow pine S4S

Joists shall lap each other over bearing partitions and shall be securely nailed together. Ends of ceiling joists shall be placed against side of rafters and securely nailed.

Bridging: Cross bridge floor and ceiling joists with at least 1 double row of 1 by 3 in. bridging in each span, see framing detail.

Studding: Outside wall and partition studs shall be one of the following:

1. No. 3 or Btr. Douglas fir S4S
2. No. 3 or Btr. West Coast hemlock S4S
3. No. 2 or Btr. Southern yellow pine S4S

Studs shall be 2 by 4 in. except where otherwise noted, and spaced approximately 16 in. o.c. Studding shall be tripled at corners, doubled at sides of window and door openings and doubled on edge above window and door openings. See framing details for lintel size.

Plates: Plates the same size as studs shall be one of those listed under studding. Plates shall be single at bottom and double at top.

Bracing: Provide let-in bracing at all corners set approximately at 45 degrees. Bracing shall be 1 by 4 in. let-in to each stud the full thickness and set flush with the outside edge of the stud and nailed to each stud with two nails. Thoroughly brace at corners with two braces running in opposite directions where openings close to corners interfere with regular bracing. See framing elevations. Bracing may be omitted when diagonal sheathing is applied.

(To be continued)

CONVERSION TABLE FOR DRILL PRESS

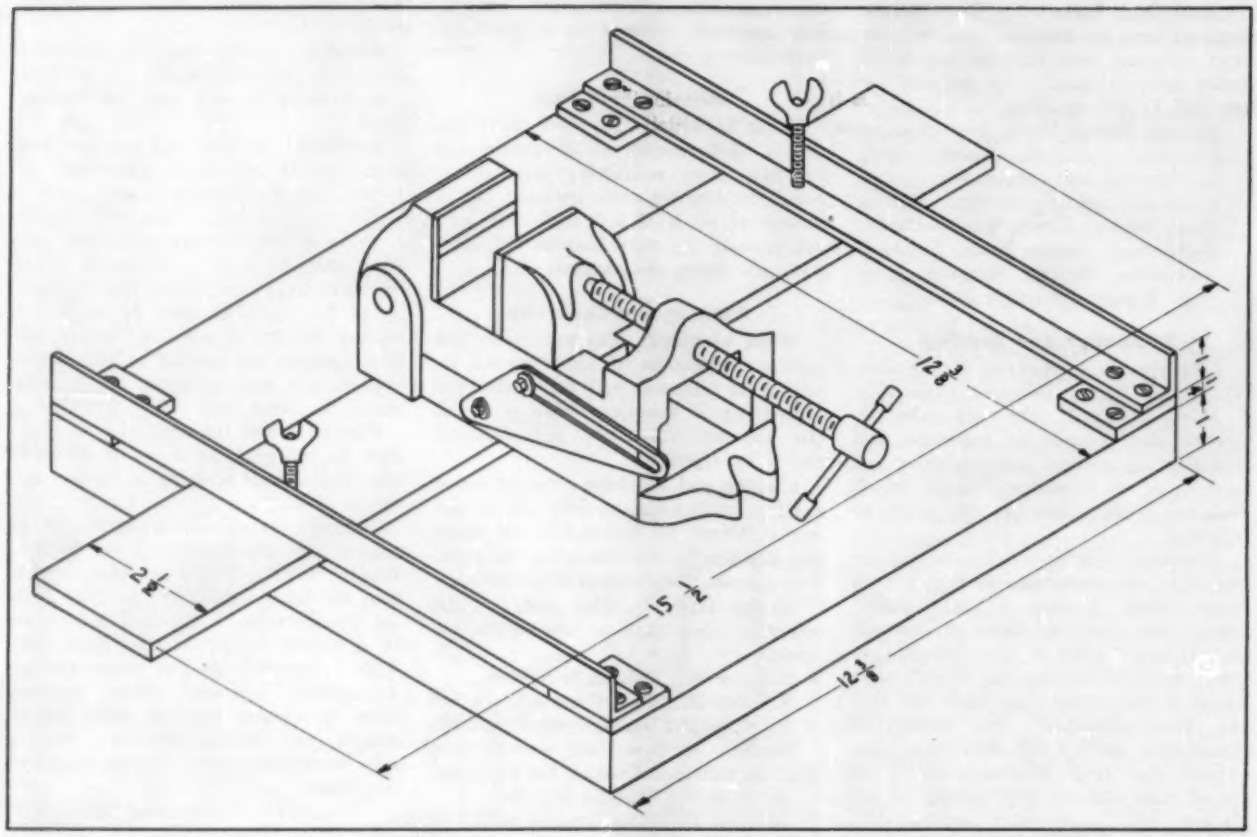
JOHN E. REILLY
Industrial Arts Instructor
Shawano Senior High School
Shawano, Wis.

A conversion table for the drill press is a handy method of clamping most of the general work in the metal shop.

The conversion table, once it is used, readily lends itself to the holding of a variety of small parts securely, for general drill press work. Thumbscrews quickly clamp the base plate of the vise in the proper position for drilling holes, or for the application of countersinking, counterboring, and reaming operations.

BILL OF MATERIALS

Pcs. Req.	*Material*	*Size*
1	Plywood	1 x 12⅜ x 12⅜ in.
2	Angle iron	¼ x 1 x 12⅜ in.
4	C.R.S.	¼ x 1½ x 1½ in.
2	Thumbscrews	¼ x 1½ in., No. 20 N.C.
6	Sq. nuts	¼ in. No. 20 N.C.
8	R.h.b. wood screws	No. 9 x ¾ in.
16	F.h.b. wood screws	No. 7 x ¾ in.
1	Steel plate	¼ x 2½ x 15½ in.
1	Machine screw, washer and nut	⅜ in.
4	Sheet metal shims	24-ga. x 1 in.



Drill press holding jig

Procedure for Making Table

1. Fasten 1½ by 1½-in. support blocks to plywood.
2. Drill and tap thumbscrew holes.
3. Braze nuts to angle iron.
4. Center punch and drill holes to fasten angle iron to support blocks.
5. Drill ½-in. hole in center base plate. Countersink for ½-in. machine screw.
6. Fasten base plate to vise.
7. Slide plate under angle iron.
8. Adjust thumbscrews.
9. Fasten conversion top to drill press table.

Students find this method of safety holding work a welcome part of their shop training as well as a worthwhile project for use in the metal shop.

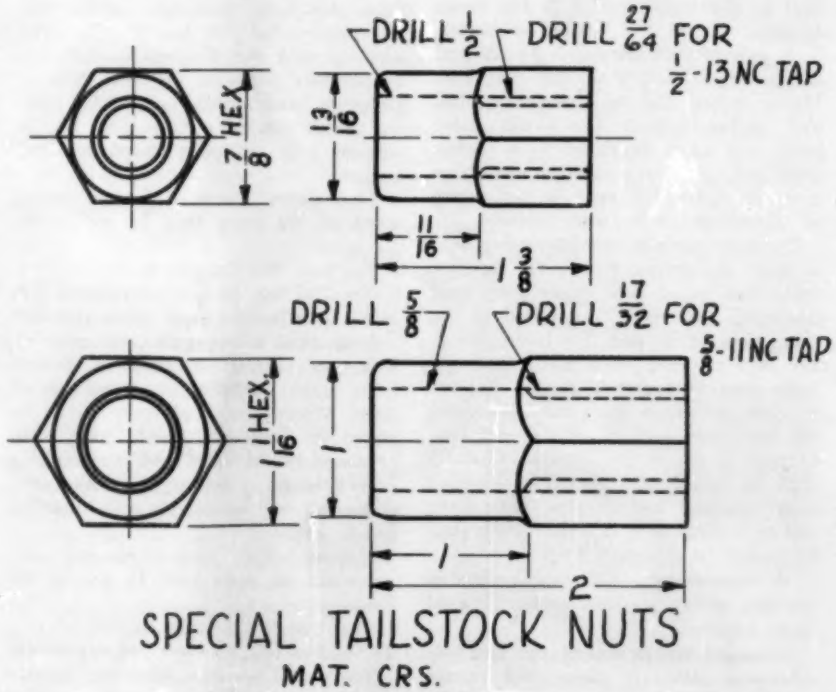
SPECIAL TAILSTOCK NUTS

ALFRED GRAYSHON
Machine Shop Instructor
Olney High School
Philadelphia, Pa.

Material required:

⅞ hexagonal C.R.S. 1½ in. long (bench lathes)

1 1/16 hexagonal stock 2 1/16 in. long (floor type lathes)



Details of the special tailstock nuts

Otherwise use 1½-in. round C.R.S. of proper length which will have to be milled for the hexagonal section of the problem.

Procedure: Chuck one half the length of the piece, face and turn the outside round. Next center drill and drill the body hole halfway through. Then tap drill for the tapped hole. Clean off the burred edges with a lathe file. Now reverse the piece in the chuck and face remaining end. Remove from the chuck and take to bench vise for tapping. Insert the tap through the body hole and this will guide the tap in tapping the hole in line.

Explanation: Wrenches are often misplaced by the learner especially after temporary removals. The lathe tailstock wrench should always stay in place for quick loosening or tightening of the locking nut. This special nut with its round top section allows the wrench to be brought up for a new position but prevents the wrench's removal entirely. It also prevents the removal from the lathe for other purposes and thereby getting lost especially for other lathe users.

On October 31, 1883, General Sheridan was appointed Commander of the United States Army. — *Wisconsin Military District.*

A WORKABLE PLAN FOR YOUR SHOP

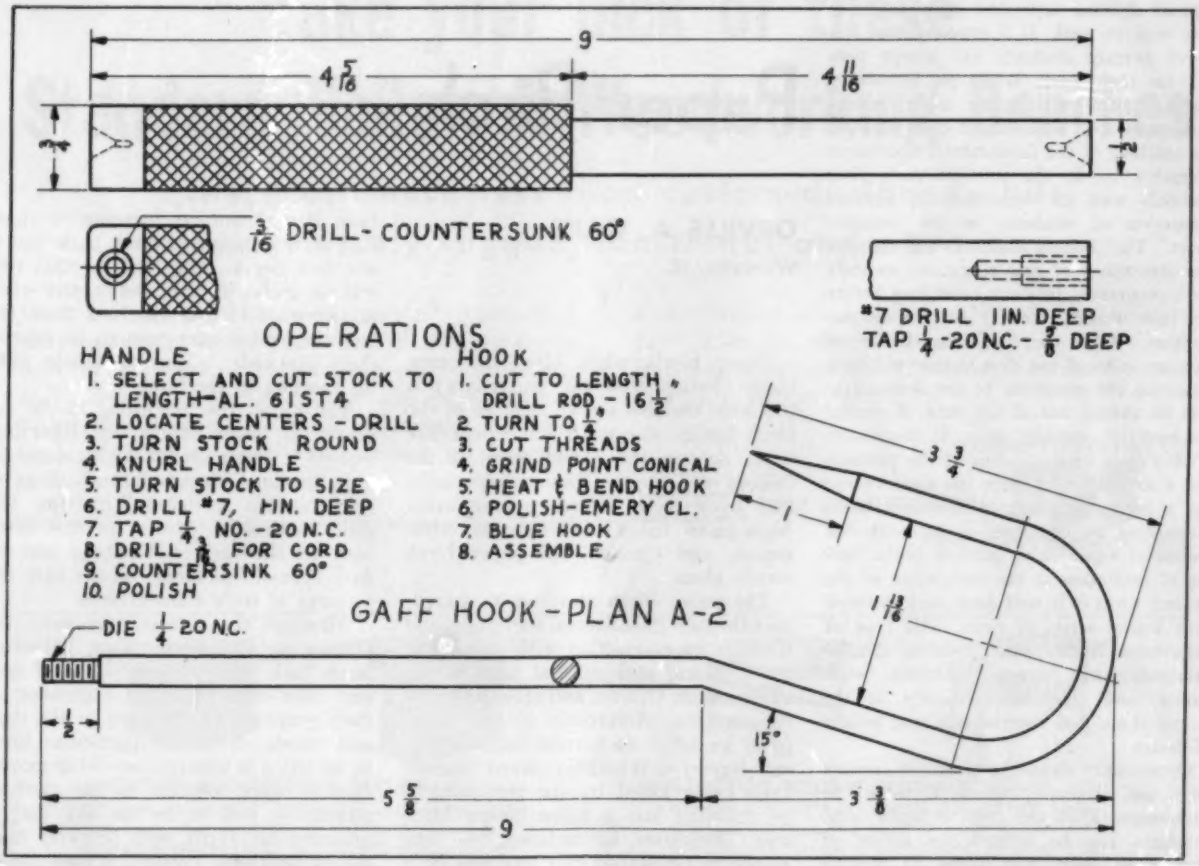
JOHN E. REILLY
Industrial Arts Department
Shawano High School
Shawano, Wis.

The problems of a pupil in a school shop can often overcome the desire of student participation in the shop program. Usually one of the basic reasons is the acceptance of defeat. Defeat in the sense that success is not apparent in the finished piece of work the pupil may have been working at over a period of time from a few days to several weeks.

There is evidence of a wide range of ability from very low to very high in accordance with results in standardized tests given by the guidance department. A more careful review of classes in the industrial-arts program indicate that the larger percentage of the students fall into the low to average groups and only a few in the high ability groups.

Therefore, more needs to be done to accommodate the individual differences of the low ability groups in our shop classes. A working plan to meet the needs of this group is a necessity. Too great an emphasis on class assignments relating to writing and textbook information can lead to unsatisfactory experiences on the part of the pupil. The low average group are harassed with disappointments throughout their school day in the academic classes. This group of students probably will achieve and experience success if shop programs are developed that call for a minimum of writing.

Pupils' needs can be best met if course content or resource units are developed in terms of pupil wants and pupil activity. They want to make, create, and learn in the form of something they can successfully make; something that relates to their present interests. In the industrial-arts courses there are unlimited opportunities to plan the program around pupil needs. An example would be machine shop; many of the students would like to have tools of their own. The desire for ownership along with the avocational pursuits of today, and the vocational choices of tomorrow are readily learned through general education. Machine-shop teaching units readily lend themselves to these goals. Realistic approaches to their problems will greatly lead to meeting the needs of the individual and to the objectives of the industrial-arts course.



Type A-2 is the same as Type A-1 except that the operations have been added on the working drawing

Each class starts the term with several class sessions devoted to selection and planning of projects that boys want to make in the machine shop. Projects are then arranged on a project list in the order of difficulty. Required projects for all are selected that contain the basic fundamentals for the course. Elective projects are made after required work is completed or during time other than the regular class period. Shop drawings of projects selected are drawn to scale by drafting classes, and tracings and blueprints are made for use by machine-shop classes. Accurate and well-executed drawings are the core of effective class participation. Each student can be held responsible for a required amount of work in accordance with his ability, in a given period of time.

Drawings used are of two types for each project.

Type *A-1* is the conventional drawing made to scale with a bill of materials and the necessary dimensions needed to complete the work.

Type *A-2* is the same as type *A-1* with the addition of a plan of procedure. This list of planning steps is either typed or printed on the tracing prior to making the blueprint.

Students may select work with either type of drawing dependent upon the level they wish to work. It is expected that the above average students will accept plan *A-1* for their work. While the below average student will derive more benefit from plan *A-2*. Essential to both plans is the teaching of the fundamental operations necessary to do the job. As each class proceeds with its work there is a rapid separation of students on the progress chart. The faster students will require demonstrations of new operations as their work progresses, in many cases long before the slow worker is ready for the demonstration. With the forgetting curve of memory in mind, the slow learner will have forgotten the essentials of the demonstration he cannot use at the time. Remedial teaching of certain units is necessary. With a clear understanding of the problem and a logical list of steps the slow learner has a better approach to the work he is attempting to complete. Along with the feeling of experiencing success, is the feeling of exultation at the completion of the project when it is well done, and executed in a logical series of steps. This type of instruction readily lends itself in the development of personal attitudes, work habits, and character necessary in the school shop, and elsewhere in our society of today.

Opportunity should be given for creative work and original planning. It should be encouraged after the term is under way. Students can be offered the choice of developing their own plans of making changes on present shop drawings where they conform to operations already offered. Once the changes or new plans have been approved and accepted, the students should be held responsible for the completion of the project. Acceptance is easily indicated with the instructor's initials on the student plan. The shop drawing of the project is a problem to be solved by the student, and the answer is the completion of the project. However, sometimes it is apparent that the student is not ready to solve the whole problem. Problem solving can come only after the necessary fundamentals are taught relating to the work.

Required work can be planned through three progress levels of achievement — beginning, intermediate, and advanced.

In the beginning group, work is largely planned by the instructor with considerable guidance in project selection and shop procedure.

The intermediate group consists of pupils with some shop experience prior to their present course. This is one of the most promising times to develop effectively units of work through pupil-teacher planning.

The advanced students have reached a place on the progress chart where the instructor can expect the student to make use of past learning applicable to problem solving methods in the development of desirable work activities in the school shop. They can also achieve a measure of success in helping the slow learner on operations they have repeatedly carried out in completion on their work. Probably the ultimate goal the instructor expects from advanced students would be their ability to complete an original problem entirely on their own.

Example: "Bill, now that you have come this far and have covered the basic work, how about combining the operations you have learned and put them into a machine of your choice." A few examples probably will help to motivate the youngster to readily accept the suggestions — sander, power hack saws, drill press or simpler types of machines that are not motor driven.

Objectives of industrial education come easily when the students have accepted the plan and shop procedure of the teacher. Increased responsibility placed on the students often provide the necessary outlets for youthful enthusiasm and serve as motivators for student work in developing desirable attitudes and outcomes in the industrial arts.

Paper Birch

ORVILLE A. OAKS
Wilmette, Ill.

Paper birch, white birch or canoe birch (Betula alba var. papyrifera) is probably the best known member of the birch family, due to its white paperlike bark. Among the sacred trees of the Ojibwe or Chippewa Indians especially, and to a lesser degree among other Algonquian tribes of Wisconsin, Minnesota, and Canada, the paper birch stands alone.

The paper birch acquired its sacredness through its universal usefulness and through its connection with Winabojo, the mythical and cultural hero of the Chippewa or Ojibwe, and other northern Algonquians. According to the Chippewa legend — each tribe has a different legend — Winabojo saved himself from being killed by the thunderbirds by crawling into a fallen hollow birch tree. Thereafter, he declared, "As long as the world stands this tree will be a protection and benefit to the human race. If they want to preserve anything they must wrap it in birch bark and it will not decay. The bark of this tree will be useful in many ways. and when people want to take the bark from the tree they must offer tobacco to express their gratitude." Thus Winabojo gave his blessing to the birch tree.

The birch tree, according to the Indians, is never struck by lightning, making it a safe shelter during a storm; also, the bark decays last of all as in the tree that sheltered Winabojo. The short horizontal marks on the birch bark are the work of Winabojo, and the dark eyes or "pictures" on the bark are pictures of little thunderbirds.

Although the custom may vary, the Ojibwe or Chippewa, when gathering birch bark, obey Winabojo's command and offer tobacco as an expression of their gratitude to the spirit of the trees and woods. After the particular birch to be felled is selected, an old respected Indian offers tobacco to the cardinal points, as well as to the sky and to grandmother earth, with properly murmured petitions. Tobacco is then placed

(Continued on page 37A)

4-POSITION WOODWORKING BENCHES with locker base. 64 x 54 x 2¼ in. laminated wood top, 12 individual lockers. 2-position units have 64 x 24 or 30 x 2¼ in. laminated wood top and 6 individual lockers. Vises and other accessories available.

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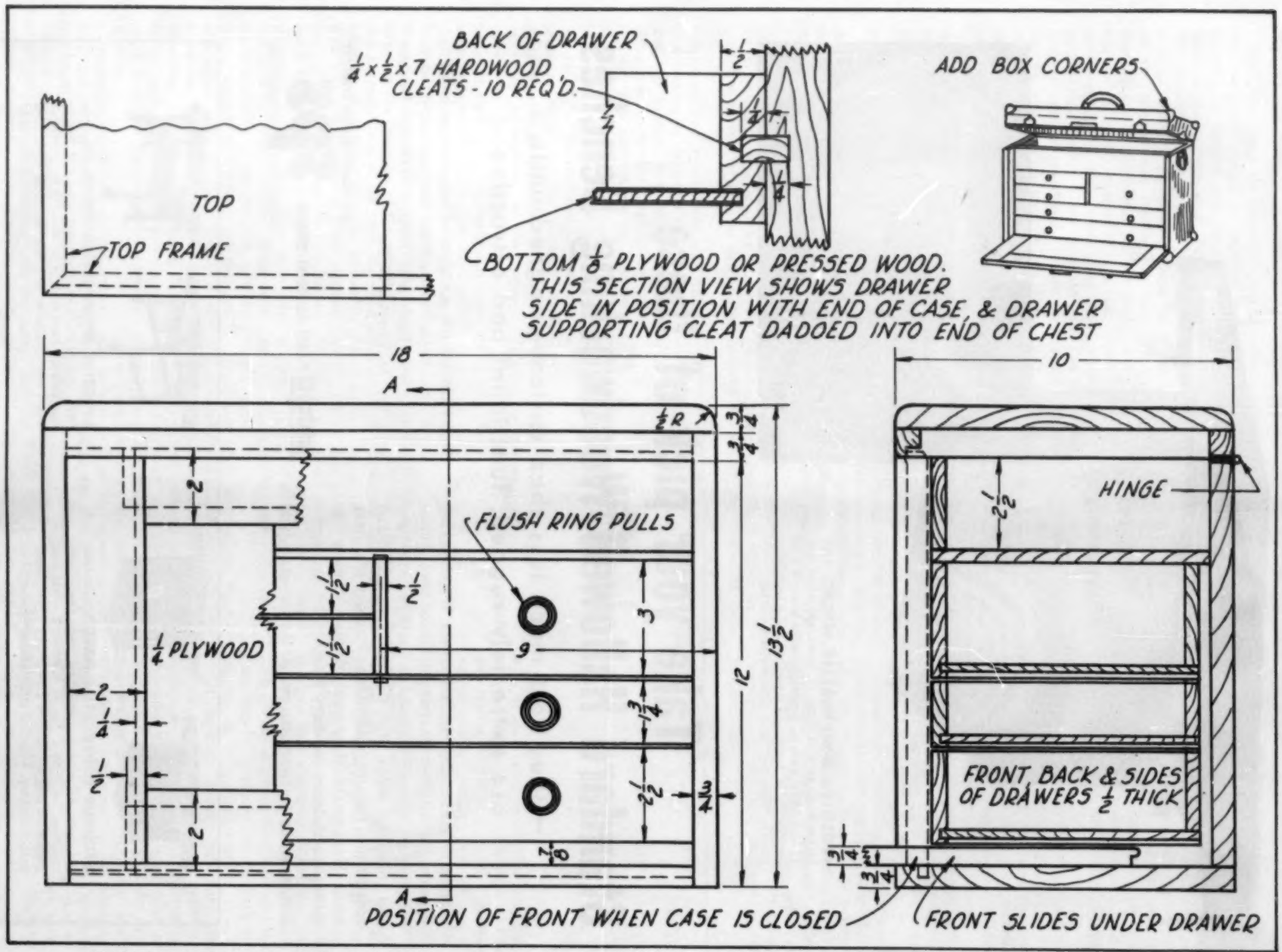
BACK OF DRAWER
¼ x ½ x 7 HARDWOOD CLEATS - 10 REQ'D.
ADD BOX CORNERS
TOP
TOP FRAME
BOTTOM ⅛ PLYWOOD OR PRESSED WOOD.
THIS SECTION VIEW SHOWS DRAWER SIDE IN POSITION WITH END OF CASE, & DRAWER SUPPORTING CLEAT DADOED INTO END OF CHEST
18
10
A
FLUSH RING PULLS
¼ PLYWOOD
HINGE
FRONT, BACK & SIDES OF DRAWERS ½ THICK
POSITION OF FRONT WHEN CASE IS CLOSED
FRONT SLIDES UNDER DRAWER

Machinist's tool chest made by high school students in the author's shop. Submitted by Louis Barocci, Cudahy High School, Cudahy, Wis.

All Machine Shop Instructors will be happy to read this good news:

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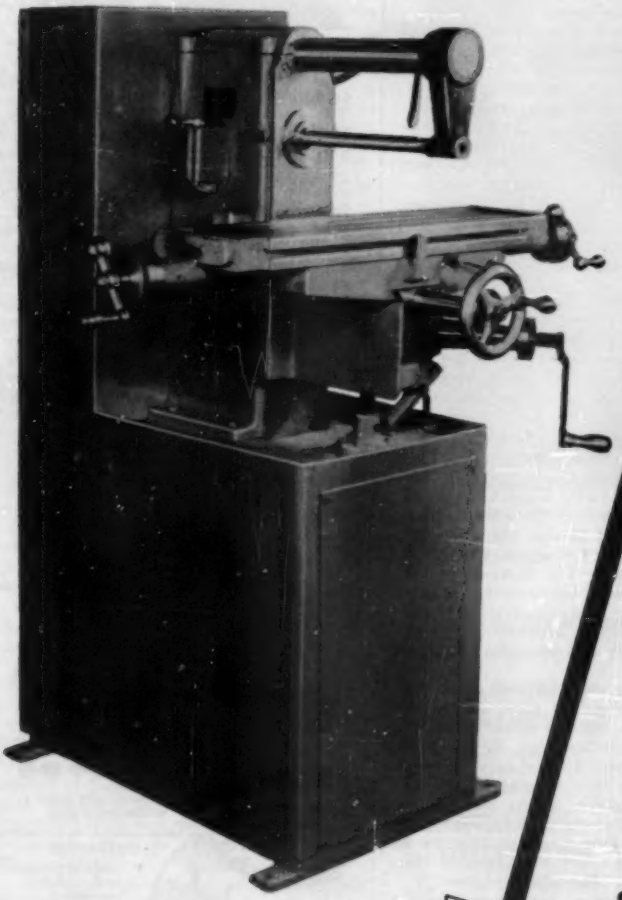
OFFERS THE
No. 3PF CROWNINGSHIELD MILLING MACHINE

The ONE machine that offers student instruction in ALL basic milling machine procedures for as little as

$1,486.00



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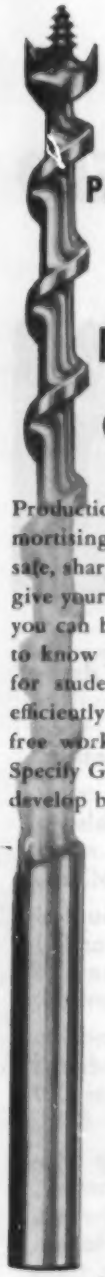

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PERSONAL NEWS

(Continued from page 4A)

training program, the results of which has meant a great deal to the economy of the state.

Mr. Cameron was born in Ontario, Canada, March 21, 1880. He attended the University of Nevada and was graduated from the Mackay School of Mines in 1912 with a B.S. degree in Mining Engineering. He later earned a master's degree in vocational education from Colorado A. & M. College.

He is survived by his widow, Mrs. Jessie E. Cameron of Carson City, and two daughters.

APPOINTMENTS AT NEW YORK COLLEGE FOR TEACHERS

The teaching staff of the State University of New York College for Teachers at Buffalo, N. Y., includes the following:

William M. Bowers, who joined the staff as an assistant professor to teach courses in graphic arts. He received his B.S., from the College for Teachers at Oswego; his M.A., from the University of Florida; and has pursued graduate study at the American University. During the past six years he has developed an outstanding graphic arts program for the public schools of Arlington, Va.

Rex Miller joined the staff as an assistant professor to teach courses in electricity and electronics. He received his B.A., from Iowa State Teachers College; his M.A., from Colorado State College; and has done additional graduate work at the University of Missouri. He gained valuable experience by teaching four years in the Air Force Technical Schools for Radio and Radar Mechanics. He has contributed much leadership in the development of public relations for industrial arts in the public schools of Iowa. He has written numerous articles which have appeared in newspapers and professional journals.

Dr. H. Gene Steffen rejoins the staff after his sabbatical leave, during which he spent the year "trailering" some 18,000 miles through the United States and Mexico. He observed a number of the industrial-arts programs throughout the states. The Mexican sojourn provided an interesting and informative study of the people, their educational system, their industrial and handcraft activities. He brings back many pictures and examples of native crafts.

Dr. Owen Harlan has returned from two years of experience on the other side of the world. During this time he served as a consultant to the Department of Education of the Union of Burma. His primary responsibility was to help in the development of a teacher-training program at the State Training College for Teachers in Rangoon. However, supervisory duties carried him to all parts of Burma and led to inspection trips to Hong Kong and Bangkok.

The "long trip home" was spread over a period of 15 weeks, nine of which were spent touring Europe in a Volkswagon Microbus. The trip around the world included stops for observations and picture taking in 26 countries located on four continents.

NEW YORK UNIVERSITY PROMOTIONS

Dr. Raymond Van Tassel, director of the industrial arts curriculum, Department of Vocational Education, School of Education, has been promoted from associate professor to professor of education.

Dr. John G. Miller, director of shops, Department of Vocational Education, School of Education, has been promoted from assistant professor to associate professor of education.

It takes good tools as well as good technique to make good craftsmen. Yet good tools such as Simonds Si-Clone Saws are *not* expensive! They actually cost less because they give you longer runs between sharpenings due to their high quality, electric furnace steel. (Holds edges longer.) And even your novice students will note that Simonds Si-Clone Saws cut smoother and straighter. These saws *encourage better craftsmanship!*

There's a choice of 12 types of Si-Clones up to 12" diameter, including Dado Heads and Metal Cutting Saws. Made to use on all standard table, radial arm or portable electric hand saw equipment. Save money — see your hardware or mill supply dealer.*

*And while you're seeing him it will pay you to check your needs for Simonds "Red Tang" Files, "Red End" Hack Saw Blades and Simonds wood and metal cutting band saw blades.

Rip
Cut-off
— Regular
— Fine Tooth
— Flooring
Easy-Cut Dado

Combination
— Planer
— No. 52
— No. 54
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Metal Cutting
— Non-Ferrous
— Friction

...at Prices Low as $2.01

Supplied with round or special shape holes

GUARANTEE

Made of Simonds steel . . . fully guaranteed against any defect in material or workmanship.

SIMONDS SAW AND STEEL CO.

...achusetts

The degree of doctor of education has been conferred upon Mrs. Aram Heghinian (nee Elizabeth Trumbower), instructor in crafts, Department of Vocational Education.

JOSEPH RISSE IN NEW POSITION

Joseph A. Risse has been named assistant director of the School of Electrical Communications, International Correspondence Schools, Scranton, Pa.

He has been with ICS since September, 1956. In his present position he reports to Joseph F. Witkowski, director of the ICS School of Electrical Communications.

NEW MEMBERS IN EPSILON PI TAU

The Alpha Rho Chapter of Epsilon Pi Tau installed new members and honored several outstanding friends of industrial education at a banquet held at the Hotel Earle, New York City, on June 15, 1957.

The new members are: Douglas R. Bennett, Ruth Gordon Brauner, Louis E. Cairo, Jr., Herbert Deutsch, Frank Di Giacomo, Patrick J. Fitzmaurice, Victor C. Garibaldi, Martin Gatsoff, Alphonse A. Gentile, Peter Koulianos, Frederick R. Kowalski, Stanley Kuperstein, William E. MacLachlan, Dominick Santopietro, Roger L. Staten, Nicholas D. Surdo, John A. Vergari, and Carl W. Zelman.

All of these students have qualified for membership in Epsilon Pi Tau through their high scholastic attainment while they have attended New York University, Department of Vocational Education.

♦ JOHN C. HAUSER, formerly of South Kitsap High School, Port Orchard, Wash., and Dr. Earl R. Hepler, University of Missouri, Columbia, Mo., recently joined the industrial arts education staff of Western Washington College of Education, Bellingham, Wash.

Mr. Hauser, with a master of arts degree from Colorado State College of Education, Greeley, Colo., is teaching metalworking and jewelry.

Dr. Hepler, with a doctor of education degree from the University of Missouri, is teaching woodworking, electronics, and drafting.

Marvin L. Carter, from South West State College, Springfield, Mo., is substituting in the department of industrial arts for Dr. Pat H. Atteberry, who is on leave from the college for the fall quarter.

Dr. Ray Schwalm is acting chairman of the department.

♦ GEORGE GENEVRO, formerly Department Chairman of Industrial Arts at Modesto High School, Modesto, Calif., is now teaching in the general metals and machine-shop areas at the Long Beach State College, Long Beach, Calif.

He is a graduate of San Jose State College, and received his master's degree from the State College of Washington.

♦ B. DAVID MACON, a native son of California, and former Industrial-Arts teacher with the Long Beach public schools, Long Beach, Calif., is teaching in the area of general wood-working at Long Beach State College, Long Beach, Calif. He received both his bachelor's and master's degree from Long Beach State College.

♦ ROBERT L. NICHOLSON, who works in the area of handicrafts, has joined the staff at the Long Beach State College, Long Beach, Calif., after the most recent assignment with the public schools of Binghamton, N. Y.

He received his bachelor's degree from the

(Continued on next page)

Your students will enjoy building any of these interesting projects. The clear, easy-to-follow plans—plus big easy-to-work panels—make for professional-like results when you use

FIR PLYWOOD

Look for DFPA trademarks—your assurance of DFPA quality-tested fir plywood. PLYPANEL is versatile one-side grade of interior-type fir plywood. For all outdoor uses, insist on EXTERIOR-TYPE; the EXT-DFPA on the panel edge is your positive identification.

INSIST ON DFPA-INSPECTED FIR PLYWOOD

38 PLANS
for classroom projects
FREE
to industrial arts instructors

CHECK PLANS YOU WANT—
MAIL COUPON—THAT'S ALL!

☐ UTILITY TABLE	☐ CHILD'S TABLE AND STOOLS	☐ PATIO FURNITURE
☐ STACKING CABINETS	☐ BUNK BED	☐ ODDS 'N ENDS CABINET
☐ BUFFET STORAGE CABINET	☐ BOAT BED	☐ 5' SAILER
☐ UTILITY SHELVES	☐ TRAIN TABLE CABINET	☐ 15' SAILBOAT
☐ TOOL-CABINET WORKBENCH	☐ COVERED SAND BOX	☐ 20' SAILBOAT
☐ DOUBLE DUTY DESK	☐ TOY STORAGE BLOCKS	☐ 11'3" OUTBOARD
☐ COFFEE TABLE	☐ PORTABLE GARDEN CADDY	☐ 9' FLAT BOTTOM DINGHY
☐ BEDSIDE TABLE	☐ SECTIONAL PATIO TABLES	☐ 7'9" PRAM DINGHY
☐ STUDENT'S DESK	☐ OUTDOOR SERVING WAGON	☐ 13'4" OUTBOARD
☐ CHEST OF DRAWERS		☐ 13'6" INBOARD RUNABOUT
☐ TWO-DOOR CABINET	☐ SUN SLED	☐ HOG HOUSE
☐ TV STOOLS	☐ GARAGE STORAGE BOX	☐ POULTRY HOUSE
☐ CHILD'S TUMBLER	☐ GARDEN CABINET	☐ ROLL-AWAY POULTRY NEST

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Without obligation or charge, please send me a copy of the plans I have checked above.

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SCHOOL _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

(Good in U.S.A. Only)

PERSONAL NEWS

(Continued from previous page)

University of the State of New York and took his master's degree from Oregon State College.

♦ ERNEST RAWSON, formerly head of the automotive department of Stout State College, Menomonie, Wis., is teaching in the automotive area at Long Beach State College, Long Beach, Calif., and assists with the supervision of student teaching.

He has had considerable experience teaching in the public schools and various colleges. He received his master's degree from Colorado A. & M. College, and has taken additional graduate work from Pennsylvania State College, Wayne University, and the University of Missouri.

♦ RUSSELL JOURNIGAN, who was on temporary appointment at Long Beach State College, Long Beach, Calif., last year, is now a regular member of the staff. He teaches in the areas of electricity and electronics.

News Notes

MILWAUKEE ASTE CHAPTER'S SPECIAL PROGRAM

An "Industry and Education Night" program was held at the Wisconsin Club, Milwaukee, Wis., on Friday evening, November 1, by the Milwaukee Chapter of the 38,000-member American Society of Tool Engineers. More than 500 were in attendance.

The significant purpose of this event — the kickoff for all such programs held annually by ASTE Chapters during the month of November throughout the United States and Canada — was to discuss industry's needs for formally trained tool engineers, and the extent to which our present educational procedures may be meeting these needs.

A recent survey conducted by ASTE's National Education Committee has established the fact that one out of every three mechanical and industrial engineering graduates enters the field of manufacturing engineering; yet the present training engineers are receiving in colleges and universities inadequately prepares these engineers to best meet *actual* industry job requirements. These findings, along with the fact that too few high school graduates are choosing engineering as a profession, present a vitally serious problem.

This year the Milwaukee Chapter held its "Industry and Education Night" program in conjunction with the semiannual meeting of the Society's Board of Directors at the Schroeder Hotel, October 31 and November 1. Friday night's program included a reception and dinner in honor of the Society's officers, directors, and national committee chairmen.

A panel discussion followed on "What Industry and Education Expect from Each Other." Speakers included Dr. George A. Parkinson, vice-provost, University of Wisconsin — panel moderator; Dr. Arthur Bernard Drought, dean of engineering, Marquette University; and Rodgers G. Wheaton, president, Line Material Industries, who represented top-flight industry in the twofold debate.

George Riordan, chairman of the Milwaukee Chapter, was toastmaster of the evening.

♦ College doors have swung open this fall for 268 young men and women whose education is being largely financed by Ford Motor Company Fund scholarships. Michigan will be represented by 172 students. The remaining 96 live in 19 other states.

Ford Fund scholarships were initiated in 1951, and since then have been awarded to a minimum of 70 sons and daughters of Ford Motor Company employees each year. Enrolled in 90 different colleges and universities this fall will be 198 seniors, juniors and sophomores, and 70 winners of 1957 scholarships, including 38 from Michigan, who will enroll as freshmen.

♦ The report of the Mid-Atlantic Regional Conference conducted last spring by The President's Committee on Education Beyond the High School was published on September 18. The conference, held April 30 and May 1 at New York University, was co-sponsored by the Middle States Association of Colleges and Secondary Schools, regional accrediting organization.

The 38-page booklet contains the conclusions reached by participants at the conference program, and photographs of speakers. Taking part were 300 educators and laymen from Delaware, New Jersey, New York, Pennsylvania, Puerto Rico, and the Virgin Islands.

The conference was one of five such "grass roots" meetings held throughout the country this year. Results of these meetings were submitted to the President's Committee, which recently published its report.

Participants at the Mid-Atlantic Conference were concerned with all forms of post-high school education. Among the specific topics they considered were the diversity of educational opportunity, adult education, ways and means by which all persons can acquire training according to their abilities and the community's needs, the role of government, and institutional resources.

(Continued on page 24A)

SHELDON
U.S.A.
CHICAGO
Variable Speed
PRECISION LATHES
A new series of 11" and 13" Precision lathes with . . . toolroom accuracy . . . spindle speeds to 2,000 r.p.m. . . . instant and automatic selection of speeds . . . increased horsepower to spindle . . . and a full range of toolroom and production accessories for greater versatility.
Write for This New Bulletin!
complete specifications . . . detailed explanation of new variable drive . . . information on many new production accessories.
SHELDON MACHINE CO., INC.
4244 N. Knox Ave., Chicago 41, Ill.

How do your projector maintenance costs compare with these averages?

Recently we surveyed a number of 16-mm-projector owners and service shops to learn how much it costs to maintain Kodascope Pageant Projectors in top working order.

We found—as you, too, will find—that Pageant maintenance costs are surprisingly low.

Typical case histories show dollars and cents of low-cost Pageant Projector maintenance

1. It takes only 57 minutes per year, on the average, to service each of the 55 Kodascope Pageant 16mm Sound Projectors used by one large Midwest school system. Parts cost just $1.45 per year per unit, average. Average yearly use per projector, *720 hours! ! !*

2. No annual repairs on 8 Pageant Projectors for three years is the report from a New York business firm with a fleet of 15 machines. The remaining 7 units needed only minor repairs during the three year period.

3. A fleet of 38 Pageants, operating about 500 hours per year, averaged only $2.47 per year per unit for replacement parts! Service time per year, one hour 30 minutes.

4. After 855 hours' use per year, average, replacement parts cost just $3.03 per Pageant Projector. Labor per unit, one hour 15 minutes average. This is what one large Southwestern dealer and service shop reports after keeping records for two years.

5. 1500 hours with no time lost for repairs—that's what a West Coast coordinator of A-V services reports. His school system owns *six* Pageant Projectors, which have cost less than $10.00 to maintain—about $1.67 per machine.

WHY PAGEANT COSTS ARE SO LOW

The simplicity of Pageant Projector design is one major low-maintenance factor. A Pageant Projector has fewer working parts to wear out, fewer to clean or adjust. And it runs at lower pulldown-shaft speeds; less vibration and wear is the result.

Pageant Projector simplicity makes minor maintenance jobs simpler, too. Parts are easy to get at.

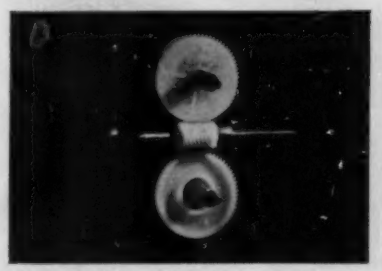
NO OILING NEEDED

You never have to oil a Pageant Projector. It is permanently lubricated at the factory. This completely eliminates the most common cause of projector breakdowns—over- or underoiling.

READY WHEN YOU NEED IT

Why should you miss showing a good film at the right psychological moment because of needless projector breakdowns? Your trouble-free Pageant is ready to roll any time you need it.

Ask your Kodak A-V dealer for a free demonstration. See Pageant Projector picture brilliance and sharpness. Hear the superb sound reproduction. Try the simplified setups. Choose from three basic models designed to fit your needs and budget.



No more oiling worries; nylon gears, oil-impregnated bearings, etc., give you *permanent* prelubrication.

For complete service accessibility, the amplifier and projector mechanism are easily removable.

EASTMAN KODAK COMPANY, Dept. 8-V, Rochester 4, N. Y. 12-193

Please send me complete information on the new Kodascope PAGEANT 16mm Sound Projectors, and tell me who can give me a demonstration. I understand I am under no obligation.

NAME _____ TITLE _____

ORGANIZATION _____

STREET _____

CITY _____ STATE _____ (Zone)

Kodak

NEWS NOTES

(Continued from page 22A)

NEW TREE IDENTIFICATION GUIDE

A new type of simplified tree guide has just been published by the Western Pine Association to help students and others in identifying the ten principal softwood trees of the 12-state Western Pine region. It is in the form of an illustrated folder entitled "Western Pine Region Timber," and free copies are available from the *Western Pine Association, Yeon Building, Portland 4, Ore.*

The easy identification guide covers Ponderosa pine, Idaho white pine, sugar pine, Douglas fir, larch, Engelmann spruce, lodgepole pine, white fir, incense cedar, and red cedar. These species grow in a region consisting of Arizona, New Mexico, Colorado, South Dakota, Montana, Wyoming, Idaho, Utah, Nevada, Eastern Washington, Eastern Oregon, and California outside the redwood region.

With the tree guide the folder presents latest statistics on how much forest land there is in the region, how much timber, how much lumber is produced each year, and other figures.

FUTURE TEACHER SCHOLARSHIP AWARD

The California Industrial Education Association, Southern Section, has recently announced its Future Teacher Scholarship Award Program.

The purpose of the CIEA(SS) Future Teacher Scholarship Award is to encourage the recruitment of industrial education teachers in the state of California. The essential feature is a cash award of $200. This will be paid to the selected individual on completion of enrollment in a University or College accredited by the California State Department of Education to train industrial education teachers. Evidence of enrollment shall be presented to the CIEA(SS) Executive Council, in written form, signed by the college registrar.

Qualifications for the Award

This scholarship may be awarded to a graduating high school student, who desires to become an industrial education teacher on the basis of the following qualifications.

1. The candidate must be a graduating high school student;
2. He must have indicated his intention of becoming an industrial education teacher;
3. Plan to enroll in an accredited California College or University;
4. Show that he would benefit from this award.

NEW INDUSTRIAL ARTS BUILDING

The first increment of the proposed new semimodern type Industrial Arts Building at Long Beach State College, Long Beach, Calif., is on the drafting board. A total of $1,350,000 has been budgeted for the first increment, which will include ten laboratories, staff offices, central supply room, and various auxiliary rooms. The second increment will be budgeted so that it will be under construction before unit number one is completed. The building is expected to be completed by the fall semester of 1960.

KODAK'S NEW HIGH SCHOOL PHOTO CONTEST

Eastman Kodak Company announces sweeping changes in the Kodak High School Photo Contest which will present students with many increased opportunities for recognition for achievement in photography at state and national levels for themselves and their schools.

Under the new setup, contestants will compete only against other students in the same grade. Thus, high school freshmen will compete only against other freshmen, sophomores only against sophomores, etc., for State Merit Certificates and national awards. National award winners will be selected from State Certificate winners.

Because of the increased opportunities available under the new plan, the contest will offer $10,400 in cash prizes, double the amount of previous years. As in previous years, the competition, which has been newly named, has been placed on the approved list of national contests and activities for 1957–58 by the National Association of Secondary School Principals.

The Kodak High School Photo Contest is open to students in daily attendance (grades 9–12) at any public, private, or parochial high school in the United States and its territories. There is no limit to the number of black-and-white photographs an entrant may submit.

Pictures must have been taken by the students themselves, since April 1, 1957, and cannot have been entered in any other national contest. Entries can be sent in between January 1 and March 31, 1958. Winners will be announced in May, 1958.

Full information about the contest may be obtained from *Kodak High School Photo Contest, 343 State St., Rochester 4, N. Y.*

♦ The National Safety Council have prepared and made available a new batch of king-sized posters which are described in a new flyer that contains examples of these most recently prepared posters and an order blank. The posters are designed for use on

(Continued on page 26A)

No. 580 Orbital Sander $49.50

No. 480 Jig Saw $49.50

DYNO-MITE tools that give ... and take ... a lot of use!

School shops are not the gentlest of places! But these "Dyno-Mite" power tools can "take" it, and still give peak performance over the years. That's the result of the quality and craftsmanship built into all Millers Falls fine tools, which have made them so famous the world over.

The "Dyno-Mite" No. 480 is the fastest-cutting jig saw in its field, due to its exclusive design and special Millers Falls blades. The "Dyno-Mite" No. 580 Orbital Sander gives superior finishes quickly and easily, for a truly "professional" look.

Both are ideal power tools for your shops. They're handy, lightweight, yet tops for power and performance.

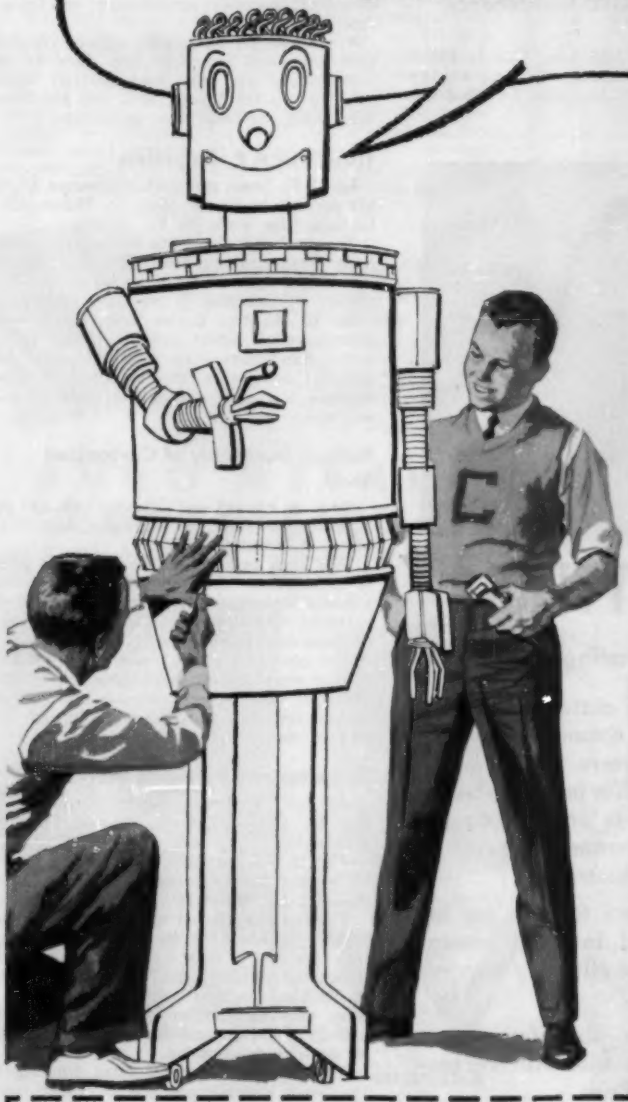
Ask your supplier to show you these outstanding "Dyno-Mite" power tools. Or write direct for free literature:

Millers Falls Company, Dept. IA-31, Greenfield, Mass.

MILLERS FALLS TOOLS SINCE 1868 ®

FINEST POWER TOOLS MADE

How about your students . . . are they preparing for the big FORD IAA program?



Sign up now for the biggest industrial arts competition in the U.S.A.

It's fun! It's educational! It's free! It's the biggest, most popular competition of its kind . . . the annual Ford Motor Company Industrial Arts Awards Program!

You and one of your students could easily be the winner of national recognition, one of hundreds of cash prizes, or a fun-packed, all-expense trip to Detroit—the industrial capital of the world!

Any industrial arts or industrial vocational project may be entered if made by a 7th through 12th grade student under the supervision of a shop or drafting teacher.

So if you haven't entered . . . act now! This is your chance to show the world your students' work.

Entries must be received by:

JUNE 10 Salt Lake City, Utah—for projects made in Montana, Wyoming, Colorado, New Mexico and states further west!

JUNE 25 Dearborn, Michigan—for projects made in all other states.

Enter your students right away!

FORD INDUSTRIAL ARTS AWARDS, Dept. B

FORD MOTOR COMPANY

INDUSTRIAL ARTS AWARDS — FORD MOTOR COMPANY

FORD MOTOR COMPANY, The American Road, Dearborn, Michigan

I am anxious to have the official I.A.A. rules booklet and entry blanks.

Please send to:

NAME_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

NEWS NOTES

(Continued from page 24A)

billboards, and are treated to resist weather. Different posters are available for each month of the year.

Flyers may be obtained from the *National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

New Publications

Closed Circuit TV System Planning

By M. A. Mayers and R. D. Chipp. Cloth, 264 pp., 8½ by 11 in., illus., $10. John F. Rider Publisher, Inc., New York, N. Y.

This book is a complete and authoritative advisory source for all who are contemplating the use of closed circuit television.

An excellent guide for those who are faced with the planning and evaluating of closed circuit TV systems, it answers all questions related to the organization of closed circuit television systems such as space requirements, cost of equipment and its installation, types of equipment available, and man power needed to operate and maintain the equipment.

Automotive Engines: Maintenance and Repair

By Ernest Venk. Edited by Earl L. Bedell and Irving Frazee. Cloth, 402 pp., 5¾ by 8½ in., illus., $5.95. American Technical Society, Chicago, Ill.

This is the second edition of this text which has done good service in vocational and on-the-job programs. It is equally valuable as an aid to the man who must learn all about automatic engines by the home-study method, and as a reference book for the practical auto mechanic.

The 12 chapters of the book present the operating principles of the automotive engine; cleaning and measuring; disassembly; cylinder heads and oil pans; cylinder block and crankcase; crankshafts and flywheels; pistons and connecting rods; valves and valve operating mechanisms; engine lubrication; cooling; mounting; assembly; remachining; and foreign automotive engines.

A new chapter on foreign engines, covering both the small economy cars such as the Volkswagen, and the high-powered sports cars, such as the Jaguar, MG, and Mercedes-Benz bring the book right up-to-date.

Transistor A.F. Amplifiers

By D. D. Jones and R. A. Hilbourne. Cloth, 152 pp., 5⅝ by 8⅝ in., illus., $6. Philosophical Library, New York, N. Y.

This book deals with the design of transistor audio-frequency amplifiers, and gives the circuit and design details of amplifiers for high fidelity reproduction. It contains 94 diagrams.

Its 10 chapters discuss transistor characteristics, small signal audio-frequency amplifiers, preamplifiers, class *A* and *B* power amplifiers, complementary symmetry, power supplies, and applications of transistor audio amplifiers.

Fatigue Durability of Carburized Steel

By J. B. Bidwell and Others. Cloth, 123 pp., 6 by 9¼ in., illus., $4. American Society for Metals, Cleveland 3, Ohio.

This book presents the findings of a group of investigators who were interested in getting a better understanding of interrelation of the variables which influence the fatigue strength of carburized parts.

The problems studied were: the effect of surface condition on the fatigue resistance of hardened steel; residual stresses in carburized steels; and the fatigue durability of carburized steels.

Drawing and Planning Worksheets

By John L. Feirer. Paper, 68 pp., 11 by 8½ in., $1.52. Chas. A. Bennett Co., Inc., Peoria, Ill.

This is the first book of a series which is to be used with the textbook *Drawing and Planning for Industrial Arts.*

The book is divided into six sections: Section I contains 18 units on beginning drawing; Section II has 5 units on sketching, designing, and planning; Section III — 4 units on drafting practice; Section IV — 6 units on shop drawing; Section V — 3 units on life activity drawing; and Section VI has 3 units on drawing information.

The worksheets provide extra drawings for the faster students, and special-interest drawings so that each student may have a different job to work on.

Behaviour of Metals at Elevated Temperatures

Cloth, 122 pp., 5⅞ by 8⅝ in., illus., $6. Philosophical Library, New York, N. Y.

This book contains four papers, the first of which by Dr. N. P. Allen, discusses the effects of high temperatures on the physical properties of metals.

The second paper by G. E. Meikle discusses the effect of temperatures up to 450 deg. C., with particular reference to airframe

(Continued on page 28A)

C&P NEW SERIES PRESSES These presses in sizes of 8x12, 10x15, 12x18 and 14½x22, provide the student with equipment that furnishes all practical requirements of hand fed press operation. May be equipped with flywheel, belt and platen guards. Also furnished for treadle operation instead of motor drive.

CHANDLER & PRICE
PRESSES and PAPER CUTTERS

C&P BENCH CUTTER An efficient, small size cutter that handles sheets up to 19"x24". Equipped with two-handed safety control.

The Standard for Printing Education

C & P presses and paper cutters have been standard equipment in commercial plants and schools for over 50 years. So, the selection of C & P equipment for printing classes places before the students *practical* equipment exactly as used in commercial practice in the entire printing industry.

In addition, special safety features are incorporated, when desired, in C & P presses and paper cutters so that all safety requirements are fully satisfied.

For practical instruction—for safety in use—the foresighted administrator recommends . . . Chandler & Price.

"HANDBOOK OF PLATEN PRESSWORK" *is one of the outstanding aids to printing furnished without charge to printing instructors. If you do not have a copy, just request one.*

C&P PILOT PRESS A thoroughly efficient little press, chase 6½x10, that teaches basic principles of press operation with exceptionally fine printing results.

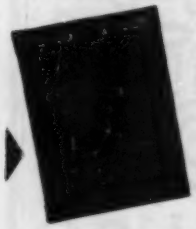
THE CHANDLER & PRICE COMPANY

6000 CARNEGIE AVENUE • CLEVELAND 3, OHIO

Only DURO Power Tools

offer "years ahead" design–safety . . .

You'll be creating confidence and building enthusiasm in your workshop when your students train on DURO POWER TOOLS. This new line of heavy duty cabinet models has been developed to meet your specific requirements for quality, utility, safety and price. Duro power tools are years ahead in design, ruggedly built to provide a lifetime of faultless service and they incorporate the priceless safety features you must have (with moving parts protected). Students operating Duro units are learning on equipment industry prefers too — tools that are rapidly becoming the "accepted standard" on wood and metal working jobs.



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See firsthand how Duro power tools will fit your shop and budget. There are many units to choose from including circular, band and scroll saws, lathes, jointers, drill presses, disc and belt sanders, etc. The Duro planning guide will give you a clear insight into proper shop planning. Write today . . . both are free.

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HIGGINS SUPER BLACK
for artwork with brush and pen on paper

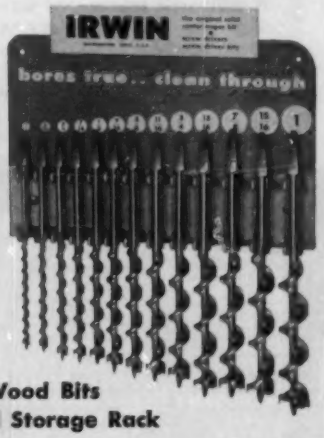
HIGGINS ACETATE BLACK
for plastic film and water-repellent drafting surfaces

TWO SUPERFINE WATERPROOF BLACK INKS OF TRUE HIGGINS QUALITY. Your urgent demands led us to the creation of these new drawing inks. We are pleased to announce that there is an ink of Higgins quality for every graphic need.

At art material dealers everywhere

HIGGINS INK CO., INC., BROOKLYN, N. Y. *The international standard since 1880*

IRWIN School Shop Special



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SIZES ¼ to 1"

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This new Irwin bit set and rack helps keep tools in place, teaches neatness in your shop. Assignments will be completed quicker, too. Irwin solid center bits cut clean, fast, accurate. Each Irwin bit hardened full length to stay sharp longer. Durable steel rack screws on wall or bench. Patented spring-steel clips hold bits firmly in place. Size markings on rack for easy selection. Quantity limited — so see your independent hardware dealer soon.

FREE BOOKLET: Tells How to Select, Use, Care for Auger Bits. A useful training help for School Shops. Send name and address to Irwin, Dept. 7-M, Wilmington, Ohio.

IRWIN Wilmington, Ohio — the original solid center auger bit • screw drivers • screw driver bits

every bit as good as the name

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BASSWOOD	WALNUT
BEECH	WHITE OAK
BIRCH	WHITE PINE
CHERRY	WILLOW
CHESTNUT	BALL BAT BILLETS
LIMBA	BIRCH DOWELS
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EDUCATIONAL LUMBER DIVISION
P. O. Box 1091, ASHEVILLE, N. C.

NEW PUBLICATIONS

(Continued from page 26A)

structures and guided missiles. The kinetic heating induced in these as speeds are increased, may make changes necessary in the materials now used.

L. B. Pfeil, in the third paper, deals with the effect of temperatures of 500 deg. C., upward on nonferrous metals, and discusses what is being done to improve them for high-temperature service.

In the fourth paper, W. E. Bardgett deals with high temperature steels and describes research aimed to produce compositions suited for particular applications.

Prehistoric Man

By Andre Leroi-Gourhan. Cloth, 119 pp., 5⅝ by 8½ in., illus., $4.75. Philosophical Library, New York, N. Y.

The author of this book is the director of the Museum of Natural History, Paris. He is therefore well qualified to write a book such as this.

He gives us a very interesting tale of how man lived in prehistoric times, based on what archaeologists found at various times and in various places on the globe.

In 10 chapters he discusses the method of prehistory, climate and nature, prehistoric man and his works, the birth of the tool, the first artists, the last primitives, the age of the reindeer and how man lived during this period, and the end of prehistoric times.

How to Make Ceramics

By Gertrude Engel. Cloth, 144 pp., 6¾ by 10⅝ in., illus., $2. Arco Publishing Co., Inc., New York, N. Y.

A well-illustrated book which contains clear and concise descriptions of ceramics through the ages, and ceramics used as a hobby. It also describes the tools and clays used, casting and finishing, hand modeling, sculpturing, the potter's wheel, and decorating ceramic ware, and the use of glazes and kilns.

It also explains how to pour a mold.

Construction of an Astronomical Telescope

By G. Matthewson. Cloth, 100 pp., 5 by 7½ in., illus., $3. Philosophical Library, New York, N. Y.

This second edition is an interesting and useful book for the hobbyist who wishes to follow his interests in astronomy.

The book contains 12 chapters in which are discussed the types of telescopes, the mirror, grinding, polishing, testing, figuring, parabolizing, silvering, prism, constructing and mounting the telescope, setting up and adjusting the telescope, and an inexpensive mounting.

Retention in High Schools in Large Cities

By David Segel and Oscar J. Schwarm. Paper, 29 pp., 5⅞ by 9 in., 20 cents. U. S. Department of Health, Education, and Welfare, Washington, D. C.

This brochure contains a report of a study of school holding power covering cities of over 200,000 population.

The chapters present the results obtained under the headings of actual class membership, holding power, pupil mobility, involuntary withdrawals, and voluntary withdrawals.

The summary contains a finding of facts, an analysis, and suggestions for improvement.

Textbook of Dairy Chemistry — Vols. 1 and 2

Third Edition by Edward R. Ling. Vol. I, cloth, 227 pp., 5⅝ by 8¾ in. Vol. 2, cloth, 140 pp., 5⅝ by 8¾ in., illus., $12 per set. Philosophical Library, New York, N. Y.

This is the third edition of both of these

a School Shop "must"

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UNIVERSAL® IRON BENDER

Bends Flats, Rounds, Bar, Angle & Pipe

Model #1 — WRENCHLESS TYPE

SAMPLES OF BAR BENDING

Simulate in the shop the 101 different bending jobs your students will be called on to perform in repair, maintenance and production work. Teach them to make neat, quick and accurate round or square cold bends on pipe, conduit and ornamental iron work. Make them proficient in forming "U" bends, eye bolts, angle iron, automobile spring eyes, heavy bends, sharp square and 90° bends, and a host of others. The Hossfeld Bender has been proved over the years in metal-working, welding and repair shops. It replaces special machinery, and is as practical and indispensable as a shop vise.

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volumes which have been revised and enlarged.

These books will be very useful to all who are interested in milk and milk products, and especially to students taking courses in dairying and agriculture and those engaged in the technical branches of the dairy industry.

A Guide to School Integration

By Jean D. Grambs. Paper, 28 pp., 5 by 7⅛ in., illus., 25 cents. Public Affairs Pamphlet No. 255. Public Affairs Committee, Inc., 22 East 38th St., New York 16, N. Y.

The pamphlet outlines the kind of preparatory action that is needed in the community and sets forth the responsibilities of the schools themselves in easing the transition from segregation to integration.

As a preliminary step the pamphlet suggests the formation of a community planning group representing all segments in the community to assist and support the school board in preparing for integration.

"Agreement is needed on only two fundamental points," the pamphlet says: "that this community is going to abide by the supreme law of the land, and that this community is not going to tolerate the tactics of outside or local hoodlums and agitators. Agreement does not have to be reached on the merits of desegregation."

Marine Electrical Practice

By G. O. Watson. Cloth, 325 pp., 5¾ by 8⅝ in., illus., $12. Philosophical Library, New York, N. Y.

An excellent text for marine engineers who are studying for advanced examinations, also for electrical draftsmen, and installation, maintenance, and operating engineers of electrical equipment.

The 20 chapters give comprehensive information on insulation and temperature ratings of machines, d.c. generators, d.c. switchgear, rotary amplifiers, a.c. generators and voltage regulators, a.c. switchgear, distribution, cables and methods of installing them, motors and control gears, storage batteries, steering gears, lighting, tankers, insulation testing, graphical symbols, regulations and regulating organizations, and useful information.

People's Capitalism, Part I

Digest Report by David M. Potter. Paper, 61 pp., 5⅜ by 8¼ in., 25 cents. Published by The Advertising Council, 25 West 45th St., New York 36, N. Y.

This is a digest of the eight sessions of the American Round Table, started in 1950, and sponsored by Yale University and The Advertising Council.

The discussion covers: I — What is a people's capitalism; II — What has made it possible; III — Can it develop in other countries; IV — Unsolved problems of the American economy; and V — People's capitalism and human values.

A UN Peace Force?

By William R. Frye. Public Affairs Pamphlet No. 257, paper, 28 pp., 5 by 7⅛ in., illus., 25 cents. Published by Public Affairs Committee, Inc., 22 East 38th St., New York 16, N. Y.

This booklet presents a study made for the Carnegie Endowment for International Peace. The author describes how the (UNEF) United Nations Emergency Force was born on Wednesday, November 7, 1956, by a vote of 64 in favor, none opposed, and 12 abstentions, and how, eight days later, on Thursday, November 15, 1956, at 9:35 a.m., the first UN troops (45 Danes) landed at Abu Suweir Airfield, ten miles west of Ismailia, Egypt.

The book also discusses the problems of

(Continued on next page)

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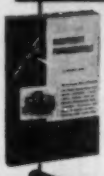

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COLOR TV TRAINING MANUAL

For advanced students. Covers principles of the Color TV system, including colorimetry, make-up of the color signal; Color receiver circuits (chapters on every type of circuit used in the receiver); Color receiver servicing, including setting up the Color picture tube, alignment, trouble-shooting, test equipment required; also valuable appendices containing equations, vectors, color blocks and colorplates. A comprehensive Color TV training course. 260 pages; 8½ x 11"; profusely illustrated. Order *TVC-1*, only $4.95

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A complete, simple explanation of modern Television principles, operation and practice. Covers Cathode Beam Formation and Control; Beam Deflection Systems; Beam Modulation and Synchronization. Includes analysis of CR tube construction, camera tubes, voltage supplies, saw-tooth generators, sync circuits, control functions, receiving antenna circuits, RF input tuning systems, IF systems, AGC, etc. Fully illustrated; 208 pages; 8½ x 11". Order *TV-1*, only.....$3.00

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NEW PUBLICATIONS

(Continued from previous page)

what the size of a permanent police force should be, whether it should consist of volunteers or a quota force, where it should be based, who should command it, how the costs should be shared, what the program for action should be, etc.

The correct solution of these problems will show whether the UN and the UNEF will be a permanent success or not.

General Metal Shop — Teacher's Work Manual

Paper, 124 pp., 8½ by 11 in., illus., Bulletin No. 14, 1955–56. Board of Education of the City of New York, 110 Livingston St., Brooklyn 1, N. Y.

This book's contents presents material the instructor needs in teaching general metal shop in industrial arts for grades 7, 8, and 9.

The subject presents chapters on shop management, safety, operations and processes, teaching procedures, industrial information and interrelation with other subjects, guidance, and visual aids and field trips.

The book contains upwards of 65 working drawings in sheet metal, art metal, and wrought iron.

Basic Physics, Vols. 1 and 2

By Alexander Efron. Cloth, 724 pp., 6¼ by 9¼ in., Smythe sewn, illus., $8.95. John F. Rider Publisher, Inc., New York, N. Y.

A review of this book appeared in the November, 1957, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, on page 28A. Unfortunately, the name of the publisher was left out of the write-up due to an oversight, and we hope the reader will refer back to it.

4 new "package deals" on machinery for your shop!
Four new "package deals" of Di-Acro Precision Machines are now offered to school shops only at these low prices. Brake and Roller are Spartan models, designed especially for schools. Bender, Notcher and Shear are industry proven. Benches are heavy gauge steel.
Deal No. 1 $1385.00
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Business and Personal News

ROCKWELL SPONSORS COMPETITION

To highlight the importance of the school's industrial-arts program in a community's economic life, the Rockwell Manufacturing Company plant located at Statesboro, Ga., sponsored an industrial-arts competition in the school system.

The competition was open to all industrial-arts students in the three high schools in the county where the Rockwell plant is located, and was based on projects built by students during school time.

As winner, Marlie Turner, who built a gun cabinet, received a plaque and a Rockwell-Delta scroll saw. The award was announced at the annual Honor's Day in the Statesboro High School which Marlie Turner attends.

In making the award, Ralph A. Purcelli, manager of the Rockwell plant, pointed out that a good industrial-arts program is important to the growth of industry in a community.

Projects were judged on the basis of workmanship, appearance, originality, finishing methods, and shop procedures.

NEW WESTERN REPRESENTATIVE

The McKnight & McKnight Publishing Company have appointed Donald E. Vandegraft to be their new Western Representative serving the states of California, Washington, and Oregon.

Mr. Vandegraft was formerly an industrial-arts teacher at El Monte, Calif. He has had work experience in the building trades, in the metalworking industry, and as an auto mechanic during his military service.

RETIREMENT AND APPOINTMENTS AT BLACK & DECKER

The Black & Decker Manufacturing Company announces the retirement of Leo C. Gehring, Minneapolis Industrial-Automotive District Manager. The territory includes Minnesota, Iowa, Nebraska, North Dakota, South Dakota, and the western part of Wisconsin.

Raymond L. Mick, Denver Industrial-Automotive Division District Manager since 1956, has been appointed to replace Mr. Gehring in the Minneapolis area.

Homer E. Ridgway has been appointed Industrial-Automotive Division District Manager of the Denver district.

The Black & Decker Manufacturing Company announces also the creation of a new Industrial-Automotive Division sales district to cover the territories of Hawaii and Alaska.

Philo W. Lund, formerly Seattle District Manager, has been appointed manager of this new district.

John R. Anderson has been appointed Seattle Industrial-Automotive District Manager to replace Mr. Lund in the Northwest area.

DeWALT APPOINTS DISTRICT SALES MANAGERS

DeWalt Inc., manufacturer of homeshop and industrial wood and metal cutting equip-

(Continued on page 32A)

NEW PARENT

DRAWING ROOM DRAWER & BOARD STORAGE CABINETS

No. 512-502-2

A new approach to Drawing Room Storage — cabinet can be arranged horizontally or vertically in groups of two units as illustrated below; or in a modular unit in groups of two. Top, drawer units, board units and bases are detachable. Storage units are attached to base by positive locking action. No. 512-502-2 at left is 41½" wide, 59¼" high and 21" deep.

No. 5061-2

No. 512-2

No. 502-2

The above cabinets are 41½" wide, 33" high and 21" deep, having four units each 10⅛" wide. Cabinet units will accommodate 6 drawing boards, 18"x24" or 20"x26".

Send for free copy of 1958 School Equipment Catalog.

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6801 State Road Dept. V-19 Philadelphia 35, Pa.

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C 7702 ART TABLE

In MAYLINE School Furniture You Receive

Quality in material, workmanship, finish — a price your budget can afford — delivery as required. Oak base is finished natural or golden oak.

C7703B drawers individually keyed; master keyed; shelves separate drawers. Unit holds six drawing boards 21" x 26" x ¾". Prices sent on request.

Symbol of MAYLINE Superiority

C 7703B DRAFTING TABLE

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MAYLINE MAYLINE MAYLINE

another reason why you get

ASSURED QUALITY

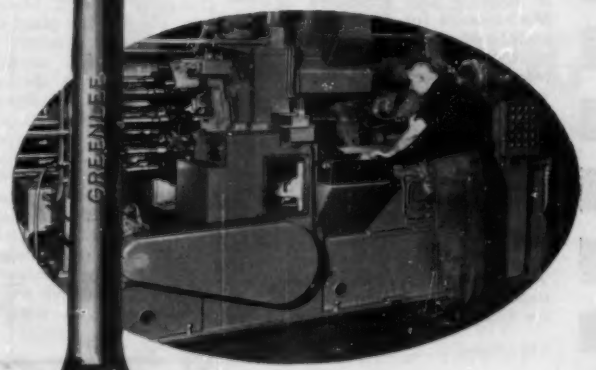
when you buy Greenlee tools

The craftsman who *really* knows tools can instantly see the *extra* quality in a GREENLEE 22 Solid-Center Auger Bit.

And when he puts these fine bits to work, he is assured better results, for all GREENLEE 22 Bits are of uniform high quality. In their manufacture all cutting parts, point, throat, and twist are *automatically milled* on a battery of precision machines. Cutting edges are true . . . screw points are accurate . . . squares are perfect . . . shanks never vary.

These are the quality features you want in your bits to assure good, clean workmanship every time. Be sure you get them, by asking for genuine GREENLEE 22 Solid-Center Auger Bits . . . at hardware and building supply dealers throughout the country.

Automatically producing Greenlee 22 Solid-Center Auger Bits on a special Greenlee bit-making machine for assured uniformity and quality.



HANDY WOODWORKING CALCULATOR . . . ONLY 25c

Converts linear to board feet, gives nail specifications, tool-sharpening tips. Compares woods, gives bit sizes for screws, concrete mixes, painting information, etc. Simple to read, 6" circular shape. Send 25c (no stamps, please).

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Auger Bits • Electric Drill Bits • Chisels and Gouges
Expansive Bits • Drawknives • Other fine tools

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FOR Day — Trade Apprentice; Evening — Adult Home Study.

Here is a work-textbook and study guide written SPECIFICALLY for Commercial Installations—incorporating the latest National Electrical Code.

Each book contains a set of 11 full-size blueprints of a modern commercial building including a Doctor's office, Bakery, Beauty Salon, Insurance office, etc.

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PLUMBING TRADES

A revision and expansion of Mathematics for Plumbers. So as not to disturb existing courses of study, the page sequence will remain the same as in the old workbook.

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240 pages ..... About $3.00

for the finest in Related Instruction

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ALBANY 5, N. Y.

BUSINESS & PERSONAL NEWS

(Continued from page 30A)

ment, has appointed two new district sales managers, as announced recently by Conde Hamlin, president.

G. W. Holey, a native of Westby, Wis., will make his new headquarters in Des Moines, Iowa, and will be responsible for the sales territory to include all of Iowa and Nebraska.

Frederick B. Smith has been promoted to district sales manager and assigned to the territory to include all of Kansas and a northwestern portion of Missouri. His new headquarters will be in Kansas City, Mo.

NEW BLACK & DECKER WAREHOUSE

The Black & Decker Manufacturing Company announces the opening of a new warehouse at 1417 Murray St., North Kansas City 16, Mo. The company maintains two other warehouses, one in Richmond, Calif., and another at their plant in Hamstead, Md.

Thomas Neilson has been appointed manager of the Kansas City warehouse. Mr. Neilson was assistant manager of the company's California warehouse before his present appointment.

ALBERT C. WEDGE NAMED VICE-PRESIDENT FOR DeWALT, INC.

Albert C. Wedge has been elected vice-president in charge of manufacturing for DeWalt Inc., subsidiary of American Machine & Foundry Company, and manufacturer of wood and metal cutting machinery for home and industry.

Formerly production superintendent, Mr. Wedge has assumed his new post and is directly responsible for all manufacturing operations.

STARRETT HOLDS SALES CONFERENCE

The 1957 Regional Managers Sales Conference of the L. S. Starrett Company was held at the Starrett plant in Athol, Mass., during the week of October 7 to 11.

Management, sales, and advertising men participating in the conference included the following: C. A. Bassett, general sales manager; D. R. Starrett, executive vice-president; A. H. Starrett, president; D. Findlay, treasurer; C. O. Newton, vice-president in charge of sales; C. G. Nordmark, advertising and sales promotion manager; R. M. Peckham, Southern sales manager; J. E. Holcomb, Pacific Coast sales manager; D. E. Gilbert, Eastern sales manager; W. W. Haskins, Western sales manager.

The entire week was devoted to round-table conferences on sales, advertising, and production.

Descriptive Material

EASTMAN KODAK'S NEW PAMPHLET

Eastman Kodak Company are offering their new pamphlet entitled "Foundation for Effective Audio-Visual Projection," to anyone interested in the effective showing of movies, slides, and slide films.

Although especially designed for the person

(Continued on page 34A)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION

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No. 9000 — Clear No. 9100 — Green

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This featherweight one-piece goggle fits all faces — men and women alike. Optically perfect and molded to .060" thickness, lenses are impact-resistant and afford protection for light grinding, spot welding, and other semi-hazardous operations. May be worn over prescription glasses. Handsome styling ends complaints about ugly, cumbersome goggles — everyone will want to wear them!

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1 to 11 doz. $7.20 per doz. 12 to 35 doz. $6.60 per doz. 36 doz. or more $6.00 per doz.

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Looking for new wood turning projects? Hundreds of shop instructors have discovered that Pepper Mills make an excellent and practical project. Now you can buy guaranteed mechanisms from the world's largest pepper mill manufacturer. Write today for actual sample mechanism and project sheets.

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Designed to meet tomorrow's educational requirements in all electrical shops and industrial training programs. Ingenious, exposed design permits study and observation never before possible. This "visual experiment" equipment is now available in three different models—one of which is exactly tailored to your needs and the proficiency level of your students.

Model 200—For Elementary Courses Provides a solid grasp of the AC-DC motors and generators most commonly used in household appliances and simple industrial machines.

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Model 700—For Advanced Courses A complete Rotating Electrical Machinery laboratory. Contains all the apparatus needed to teach the theory, construction and operation of almost every commercial motor and generator now in use—AC, DC, magnetos, interpoles, rotary transformers, sine-wave apparatus, induction regulators, dynamotors, synchros, etc.

Each model includes a fully illustrated work-manual that gives step-by-step directions for setting up each machine and discusses the principles involved and their practical applications.

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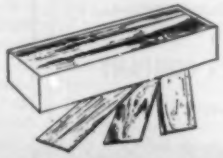
Our special process makes it possible for you to veneer without the usual costly and cumbersome equipment. You can make panels that are equal in every respect to those made by a factory using heat and pressure. Write for FREE information today.

VENEER KIT

This handy kit of 32 species of domestic and foreign veneers in 4 x 9 inch size with labels and information pamphlet is available at cost, $3.00 postpaid. Send for yours today.



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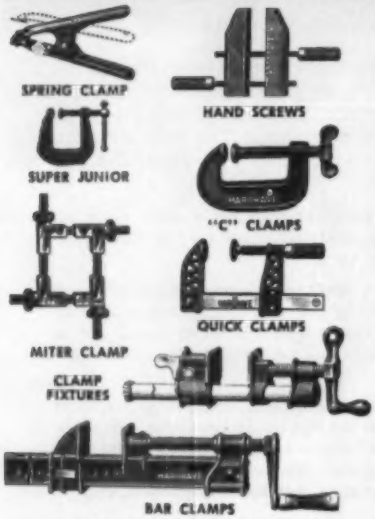

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DESCRIPTIVE MATERIAL

(Continued from page 32A)

who utilizes audio-visual equipment professionally, the book has many helpful suggestions to anyone who puts on slide or film presentations.

Included in the book are sections on how room facilities, seating plan, and screen size and type, loud-speaker location, projector location, image brightness and projector distance contribute to effective use of A-V equipment.

The twenty-page illustrated pamphlet features a data section on the lumen output of projectors manufactured by Eastman Kodak Company.

"Foundation for Effective Audio-Visual Projection" (S-3) is available at no cost.

(For further details encircle index code 1014)

SAMS ANNOUNCES SERVICE MANUAL

Howard W. Sams & Co., Inc., have introduced volume nine in an Audio Amplifier Series. This very popular series presents complete photo coverage, Standard Notation Schematic, Parts List, Voltage and Resistance Measurements, and Servicing information for each piece of equipment.

Entitled Audio Amplifier Service Manual, Volume Nine (catalog No. AA-9), this book contains complete data on fifteen amplifiers, three preamplifiers, twelve tuners, and five custom radios. All of this equipment was produced during 1956.

Besides being invaluable to the technician who services audio equipment, the technical data presented in the Sams Audio Amplifier Service Manual is of extreme interest to the Hi-Fi enthusiast, experimenter, and hobbyist who desires complete information on audio equipment.

The book contains 240 pages, and is priced at $3.95. It is sold through electronics parts distributors.

(For further details encircle index code 1015)

NEW FILMSTRIPS

The James F. Lincoln Arc Welding Foundation has released three new filmstrips entitled: "Welding Cast Iron with the Arc Welder," "Hard-Surfacing Farm Equipment with the Arc Welder," and "Heating, Brazing, Soldering and Cutting with the Arc Welder."

These filmstrips were prepared by the Foundation and the Vocational Agriculture Service of the University of Illinois.

Designed to aid high school shop instructors teaching arc welding, these three filmstrips complete a series of six. As indicated by the titles, the first and second strips explain and illustrate some of the advanced techniques of welding which are most useful on the farm. The third strip shows how the farm welder may be used for nonwelding purposes to make the machine a versatile metalworking outfit for the farm shop.

The strips are silent, 35mm. film containing approximately 40 to 45 frames. The films are presented in a step-by-step outline with clearly worded instructions. Included with each strip are quizzes and answers.

These strips may be purchased in single frame size for $1 each in the U. S. A. (postage prepaid) or $1.50 each elsewhere. The entire set of six filmstrips (the first three cover the basic welding techniques and were released earlier) may be purchased for $5, postage prepaid, $5.50 outside the U. S. A.

(For further details encircle index code 1016)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION

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HOW TO MAKE BOWLS FROM FIBERGLAS CLOTH — POLYESTER RESIN

It's easy, fascinating work. Calls for inexpensive equipment. Students can make bowls of different shapes and sizes using remnants of drapery material, dress goods, even burlap, for decorative effects. Free literature gives instructions and prices.

VINOFLEX

the Remarkable New Liquid Vinyl Plastic that Produces Foliage so Realistic and Life-Like It's Hard to Tell it From Live, Growing Leaves when Viewed from Just a Few Feet Away!

Makes perfect decorations for windows and planter boxes. Pours easily and forms a tough, resilient, rubbery material when exposed to oven heat of from 300 to 325 deg. F. It's fireproof, washable, fade-resistant, droopless. Can be cleansed with a damp cloth. Available in white opaque, clear, light or dark green, red, yellow and blue. Comes in 8 oz., pint, quart and gallon sizes. Ideal for making an endless variety of toys and novelties, too!

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MORGAN VISE CATALOG

The new Catalog No. 133A of the Morgan Vise Company is now available.

It describes all of the various sizes of vises made by this firm, such as the solid jaw and stationary base, swivel jaw and swivel base, solid jaw and swivel base of their machinists' line; also their combination pipe vise with swivel base.

Besides those mentioned above are the Morgan long jaw hinged pipe vise, the Morgan "Homecraft Vise," sheet-metal worker's vise, and the Morgan utility vise.

This firm also makes woodworkers' vises such as the No. 18-A new dual purpose vise, junior woodworkers' vise, solid nut continuous screw vise, and the (Toles Pattern) quick action vise.

Write for your copy of this catalog.

(For further details encircle index code 1017)

PECK AND HARVEY BULLETIN 57S2

A colorful new informative Bulletin No. 57S2 on Peck & Harvey Speedmaster high production dry process Whiteprinters has been issued by P & H Sales Corporation.

This new Bulletin illustrates and describes the Speedmaster Model 4000C, 44-in. Dry Process Whiteprinter, with synchronized printing and developing speed up to 40 ft. per minute; the Speedmaster Model 2500C, 44-in. Dry Process Whiteprinter, with synchronized printing and developing speed up to 25 ft. per minute; and the Speedmaster Model 1400C, 44-in. Dry Process Whiteprinter, with synchronized printing and developing speed up to 14 ft. per minute.

For a copy of Bulletin No. 57S2, send your request.

(For further details encircle index code 1018)

CATALOG OF STEEL SHOP EQUIPMENT

Standard Pressed Steel Company are offering their new eight-page illustrated catalog, showing their complete line of workbenches, tool stands, shelving, and other Hallowell pressed-steel shop equipment for shop, laboratory, and assembly line use.

The equipment, constituting more than a dozen different shop furniture categories, is reviewed in photos and text. Included are multiple unit benches, cabinet benches, standard open-type Hallowell workbenches, and heavy-duty portable benches; also shop desks, steel carts and tool stands, Hallowell stools and chairs, storage walls (multiple drawer units), storage and industrial cabinets, and Erectomatic and conventional bolted shelving.

Construction features and specifications of size, bench top materials and equipment variations offered are given.

(For further details encircle index code 1019)

BROWN & SHARPE CATALOG

A completely new Cutter and Accessories Catalog has been published and is now available from Brown & Sharpe Mfg. Co.

This 96-page illustrated catalog, designated as No. 37C, covers the company's entire line of metal cutting tools, as well as arbors, adapters, collets, vises, index plates, work driving dogs, taper mandrels, expansion bushings, and spring chucks.

Listed for the first time are over 200 entirely new items, including a new line of Ball-End Mills, both double-end and extended lengths, and an additional line of Shell End Mill Arbors.

Copies of this new catalog may be obtained.

(For further details encircle index code 1020)

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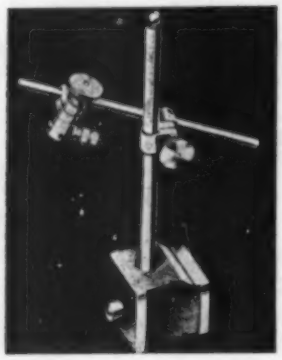
Shop Equipment News

STARRETT NO 657AA MAGNETIC BASE INDICATOR HOLDER

The L. S. Starrett Company have announced a new model of the Starrett Magnetic Base Indicator Holder. It holds all types of dial indicators including rack and pinion models with lug type backs as well as the Starrett No. 196 Indicator and Starrett No. 711 "Last Word" Indicators.



Starrett Magnetic Base Indicator Holder

Designated No. 657AA, the new indicator holder is furnished with the Starrett No. 657 Magnetic Base which features a powerful permanent magnet and a large diameter push button for turning the magnetic force on or off. The push button permits placing the indicator holder with one hand while the other is free to position the indicator.

Other features include: a ⅜-in. diameter upright post; a sleeve which holds the stem of a No. 196 Indicator and can be positioned at any height on the upright post; a sleeve which can be positioned along the length of the rod; and an indicator attachment which holds Nos. 81, 23, 655, or 656 lug back indicators. No. 711 "Last Word" Indicators are mounted directly on the ¼-in. diameter rod by means of the body clamp furnished with these indicators.

A catalog describing this new magnetic base indicator holder and the complete line of Starrett dial indicators and gauges is available.

(For further details encircle index code 1001)

THE SKIL GRIT WHEEL

Skil Corporation, manufacturers of portable power tools, have produced the Perma-Grit T-C wheel. It is an 8-in. disk which fits any bench or radial saw with a ⅝-in. arbor. Coarse grits (40–50) are brazed to the edge and one side of the wheel; medium grits (80) are brazed to the opposite side. The side grits allow the blade to sand as it cuts. The cut on the medium grit side is so smooth that subsequent planing for jointing may not be necessary. The side grits also make the blade ideal for contour cutting, dadoing, and ploughing. Wood, properly guided, may be pushed against the side of the blade for concave groove cuts.

Because the Perma-Grits are brazed on steel, a conductor of heat, the T-C tools do not scorch the work, since the steel absorbs and dissipates frictional heat before it reaches

The Perma-Grit T-C Wheel also can be used as a face sander

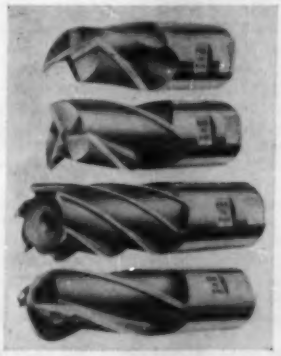
burning intensity. The side grits on the saw wheel help here, too, since the blade cuts on two sides as well as at the rim, thus preventing generation of high "localized" temperatures.

Further information on Skil Corporation's new abrasives is available.

(For further details encircle index code 1002)

NEW LINE OF HEAVY DUTY END MILLS

Brown & Sharpe Manufacturing Company have introduced their new line of 2-in. diameter shank end mills for efficient heavy duty milling. They can be profitably used in such operations as tracer-controlled milling.



Heavy Duty End Mills

Available in two, three, and six flute as well as ball-end styles, these new end mills have polished flutes, high helix and efficient rake angles. Eccentric relief sharpening produces a finer quality cutting edge. Less power is required, there is less thrust on the work, and there is greater cutting efficiency.

Write for a free copy of the illustrated bulletin (C 20), which gives complete listing of four different style heavy duty end mills. A new adapter for these end mills and other newly added different types of end mills are included.

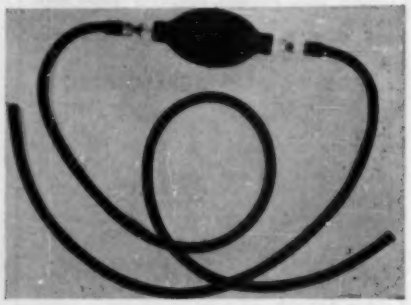
(For further details encircle index code 1003)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION

NEW SELF-STARTING SIPHON-PUMP

General Scientific Equipment Company have announced a new hand-operated, self-starting siphon-pump designed for the safe handling of concentrated acids.

The siphon-pump, called Model P, has newly developed check valves of duPont "Alathon," a compound which is unaffected



New Self-Starting Siphon-Pump

by concentrated hydrochloric, sulfuric and hydrofluoric acids (at room temperature) as well as alcohols, gasoline, and most industrial solvents. Hand bulb and tubing are of neoprene.

A full seven feet long, the siphon-pump permits speedy transfer of dangerous liquids with complete operator safety.

Full details on the Model P Siphon-Pump are available.

(For further details encircle index code 1004)

SIMONDS NEW CIRCULAR SAW LINE

Simonds Saw and Steel Company have announced a new, improved line of chrome plated, popular-priced saws for home and school workshops, contractors and light industrial use, under its *Si-Clone* brand name.

Simonds New Circular Saw Line

Made of Simonds own Electric Furnace Steel, scientifically heat-treated and accurately ground, these fast cutting saws are expertly fitted and given a hard, chrome plated finish. Chrome plating not only increases the edge-holding qualities of the steel but prevents rust and accumulation of gum and pitch on the sides of the saw. Friction and heating is reduced, greatly increasing saw life.

Nine types of saws (rip, cutoff, combination, planer, etc.) are available in the line with a choice of round, square, oblong, or diamond shape centerhole as required for use on popular makes of table, radial arm, and portable electric handsaw machines.

Saws in the new chrome plated line are made up to 12 inches in diameter inclusive, to standard specifications as listed in Simonds Si-Clone Catalog "B." All saws are fully guaranteed.

For easier identification and inspection, saws come in a colorful, new "See-Saw" package designed to insure delivery to the user in factory-perfect condition.

(For further details encircle index code 1005)

(Continued on page 38A)

PAPER BIRCH

(Continued from page 338)

in a hole at the foot of the tree. The same ceremony is repeated by filling a pipe with tobacco, which he smokes while passing out tobacco for all present to smoke. Some tribes end the ceremony with a feast.

The paper birch is the most widely distributed of all our native birches, being found, with variations, in Alaska, Canada. Newfoundland, Labrador, and on south through New York, Pennsylvania, Michigan, northern Indiana, Ohio, Wisconsin, North and South Dakota, Wyoming. and, some claim, even in the mountains of North Carolina. Usually it is a medium-sized tree, 50 to 70 feet high, and 12 to 24 inches in diameter, but it may grow to a height of 120 feet, and 4 feet in diameter. Its life is of short duration, 80 to 140 years at most. The hard, close-grained wood is mostly sapwood, of a clean white color, although the less valuable red heartwood is found in the older trees.

To the Ojibwe or Chippewa, the Forest Potawatomi, and Sioux, the paper birch was indispensable. Its bark furnished the covering for their wigwams and for their graceful birch-bark canoes, used for nearly two centuries by the Indian and white man alike in their travels through the northern lakes and rivers. It also furnished them with berry baskets; maple sugar and other storage baskets; cooking utensils, dishes and trays, funnels and cones, meat bags, fans; figures and patterns for their art and bead work; torches and tinder and as paper on which to keep their medicine lodge rituals. The inner bark, pounded, furnished an emergency flour, used as food when game was scarce; boiled, it produced a reddish dye. The sap, boiled, gave them a drink, called "birch-beer." Oil extracted from roots and twigs was used as a flavoring to help disguise unpleasant medicines, while the root-bark cooked with maple syrup furnished a soothing syrup for stomach cramps. They used the wood for their snow-shoe frames and for canoe paddles.

Today, the paper birch furnishes a commercial lumber used for shoe pegs, toothpicks, bobbins, spools, dowels, turnery, wood pulp, fuel, and novelties. It has also been used as a source of dyed wood, by boring a hole in the living tree and filling it with dye of any desired color, allowing the sap to carry the dye upward throughout the tree trunk.

I have personally watched the various Indian tribes of Michigan, Wisconsin, Minnesota, and Manitoulin Island in Ontario, gathering birch bark and making their art objects for the tourist trade. I take pride in my small collection of table mats, a trinket box with its dyed porcupine-quill design, and Christmas cards of this bark, made by the Indians at Wikwemikong, Manitoulin Island, Ontario.

The End

Open grained woods like oak or walnut look well when the grain is filled with a colored pigment like white enamel. The pigment is rubbed in with a clean cloth. When dry, a thinned coat of fresh, white shellac is added. — *Shellac Information Bureau.*

The Army Signal Corps issued specifications and called for bids for an airplane that would carry two passengers, fly for 1 hour, and make 40 miles per hour, on December 23, 1907. — *Wisconsin Military District.*

The area favorable to the discovery of oil and gas in this country is estimated at over one billion acres. About 15 per cent of this land is held under lease. — *Petroleum Newsnotes.*

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Group Assignment Chart. For use in shop classrooms. Sets of 50, 8½" x 11". $1.00

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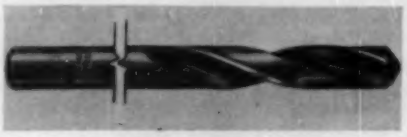
SHOP EQUIPMENT NEWS

(Continued from page 36A)

HIGH SPEED UTILITY DRILLS

Chicago-Latrobe are the manufacturers of high speed utility drills used for portable drilling. Being of rigid design and sturdy they will withstand considerable strain and will drill successfully where full length drills may fail.



High Speed Utility Drills

They are recommended for drilling truck and automobile bodies, sheet metal, stainless steel, and for general purpose drilling.

Points are split with 1.350 angles which makes the drill start right in and not walk . . . a most satisfactory drill for sheet-metal work.

The drills are available in right- or left-hand fractional sizes of 3/64 in., through ½ in., and wire gauge sizes 1 through 60.

Folder is available on request.

(For further details encircle index code 1006)

SOLARGRAY TWINDOW GLASS UNITS

Because of the architectural interest in its new Solargray Plate Glass, Pittsburgh Plate Glass Company has announced the availability of Solargray Twindow double-glazed insulating glass units in sizes up to 50 square feet.

The new Twindow product will be available in metal edge only. It is made of ¼-in. Solargray plate glass and ¼-in. regular plate glass with either ½-in., or ¼-in. air space.

Solargray Insulating Glass

Many important architectural advantages are incorporated in the new insulating glass product. Among these are:

A near-black mirror-like outdoor appearance permits additional architectural design emphasis on the fenestration pattern.

The (color-free) neutral light transmitting properties of the unit removes interior decorating restrictions on carpeting, wall, and drapery colors.

Low (37 per cent) visible light transmission of Solargray Twindow reduces noticeability of venetian blind and drapery positions

(Continued on page 40A)

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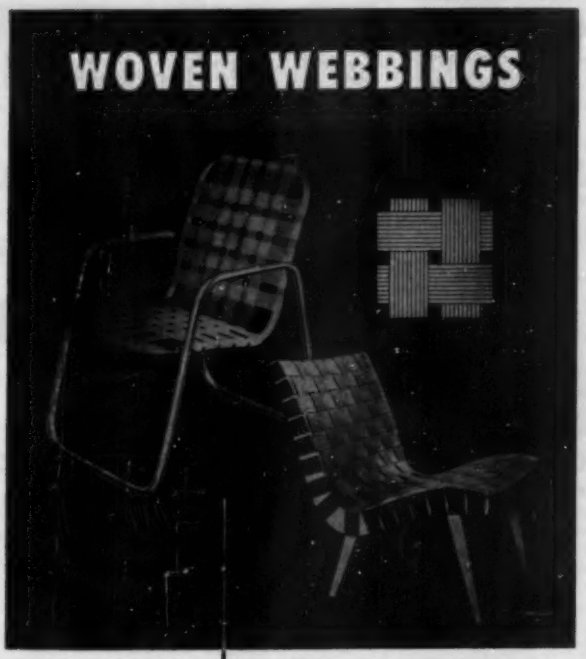

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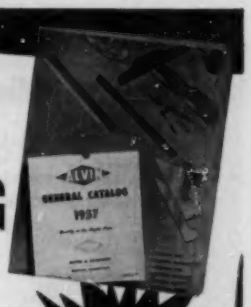

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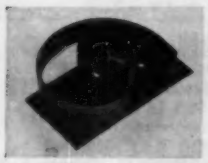

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SHOP EQUIPMENT NEWS

(Continued from page 38A)

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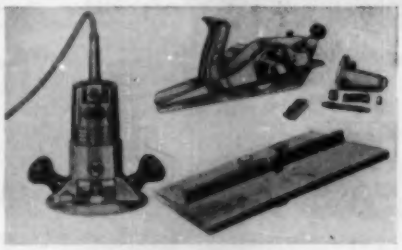
Solargray Twindow will be immediately available through Pittsburgh Plate Glass Company branches and dealers. Detailed information is available.

(For further details encircle index code 1007)

NEW ROUTER-PLANE-SHAPER

Millers Falls Company recently announced a new Router-Plane-Shaper which consists of a No. 6800 self-powered Router with full 3 amp. rating for smoother, faster, cleaner cutting, which helps bring the adventure of really professional results in cabinetwork within reach of everyone.



New Router-Plane-Shaper

Inexpensive, and offered with a complete range of economical attachments and accessories, all operated by the same power unit, the new combination is built for professional performance, yet is simple and easy to use. It boasts a number of built-in design features unmatched in models costing twice as much, and a revolutionary new line of router bits in the most popular shapes.

The No. 6800 Router (power unit plus router base) may be bought separately or in combination with the plane and shaper attachments and other accessories. The large six-inch diameter Router Base with big, easy-grip hardwood handles, is easy to handle, light and compact, and has a direct-reading scale for fine depth adjustments to precise 64ths. The rugged 3-amp. all ball-bearing Power Unit operates at 30,000 r.p.m. for fast, smooth, clean cutting.

Designed and powered for top-quality performance, the new Millers Falls Router-Plane-Shaper will find hundreds of uses in home and shop. Prices are available upon request.

(For further details encircle index code 1008)

INTRIMIK — A NEW MEASURING TOOL

Brown & Sharpe Manufacturing Company have introduced a unique self-aligning tool which measures bores and holes. It is called Intrimik, the internal tri-point micrometer, and it provides advantages in adaptability and convenience found in no other internal measuring tool. One Intrimik replaces hun-

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dreds of plug gauges because it is adjustable over a wide range of sizes. Three measuring points make line contact with the surface, so that the instrument aligns itself axially and radially, eliminating the risk of missing the full diameter measurement. As an added convenience, measurements can be read directly, without reference to a master.

Intrimik — Three-point self aligning internal micrometer

Intrimiks are furnished as individual tools or in five sets with over-all ranges of from .275 in., to 8.000 in. Extensions are obtainable to increase the depth at which measurements can be taken. Ring gauges for occasional checking and setting exact calibration are also provided. Dull chrome finish facilitates reading, and high-carbon, high-chromium steel measuring surfaces resist wear.

Intrimik — illustrated bulletin (M 54) completely describing this micrometer, is obtainable.

(For further details encircle index code 1009)

NEW DRILL PRESS VISE AND FIXTURE HOLDER

L-W Chuck Company have developed a wide range drill press vise that safely handles both rigid and nonrigid work without distortion. It is being marketed as the L-W Adjusto-Quick Control 4-in. Drill Press Vise and Fixture Holder. This precision-built device was especially designed to cut tooling costs and increase production.

New Drill Press Vise and Fixture Holder

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Easy hand pressure on a hardened and micro-ground bar locks and holds the work fast.

Literature and prices are available upon request.

(For further details encircle index code 1010)

FOLEY AUTOMATIC SAW FILER

Foley Manufacturing Company have made available their new Model 61 Foley Automatic Saw Filer, the machine that is being used universally for the maintenance of school saws.

Capacity of Model 61 Foley Filer is all types of carpenters' hand saws, either rip or crosscut, including back and miter box; meat saws; band saws ⅛ in., to 4½ in., in width; and circular crosscut saws to 16 in. in diameter. The Foley Filer will file any saw that can be filed with a three-cornered file, having teeth up to ½ in. spacing.

The Foley Filer is distinctive in that it is equipped with a special jointing guide, which automatically joints or evens the teeth as the filing progresses. This insures smoother, faster, and more efficient cutting saws.

The Foley Automatic Saw Filer is endorsed and used by leading saw manufacturers, and leading trade schools recommend it very highly.

For further information on its many outstanding features, and price list, write to the manufacturer.

(For further details encircle index code 1011)

MARK I CRAYON HOLDER

Alvin & Company have designed and produced a new heavy-duty, push-button mechanical crayon holder that is rugged in construction and functional in design. It is quick, efficient, and dependable for all general marking purposes.

The mechanical push button is devised for one hand adjustment. The Mark I has a knurled finger grip which prevents slipping, thus permitting a firm hand grip and easy

(Continued on next page)

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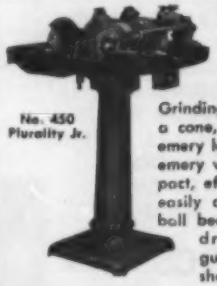

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SHOP EQUIPMENT NEWS

(Continued from previous page)

maneuverability. It is highly recommended for artists doing sketching and layout work or ideal for those heavy marking jobs on wood, metal, glass, cement, rubber, plastic, etc.

Furthermore, it is economical in that it utilizes the crayon almost completely, and it is serviceable in numerous ways, such as having a corrosive resistant, nonrolling square barrel; triple-clamp clutch which securely holds refills; instant propelling of refills by its strong coil spring ejector; and colored barrels to quickly identify the colored refills within.

The Mark I is exceptionally light in weight, but strong and durable enough to outlast and outperform other crayon holders on the market.

(For further details encircle index code 1012)

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Press-Rite OBI Press converted to horizontal position

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More information on the Press-Rite OBI Press is available.

(For further details encircle index code 1013)

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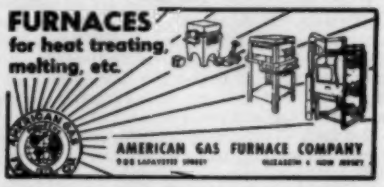

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400 North Broadway, Milwaukee 1, Wisconsin

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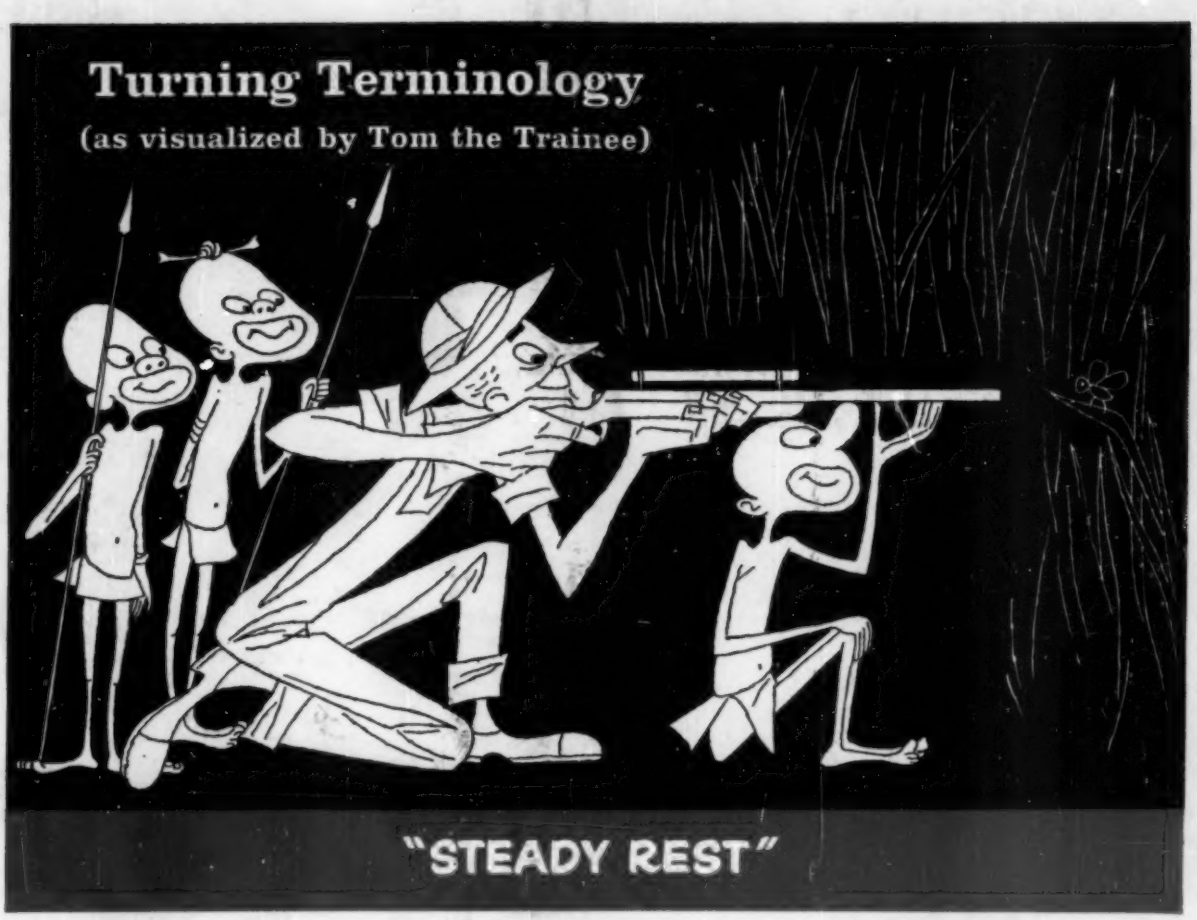

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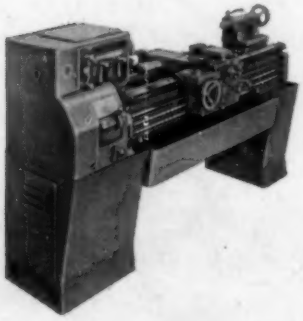

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